

DRAFT ENVIRONMENTAL ASSESSMENT

North Valley Geothermal Development Project at the San Emidio Geothermal Field

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US Department of the Interior
Bureau of Land Management
Winnemucca District
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It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

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ACRONYMS AND ABBREVIATIONS

Full Phrase

ABS	Artificial Burrow Systems
AOI	area of interest
APE	area of potential effect
BLM	United States Department of the Interior, Bureau of Land Management
BMP	best management practice
BRFO	Black Rock Field Office
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DOI	US Department of the Interior
EA	environmental assessment
EGS	enhanced geothermal systems
EMPSi	Environmental Management and Planning Solutions, Inc.
EPM	environmental protection measure
ESA	Endangered Species Act of 1973, as amended
gen-tie	generation tie
GHMA	general habitat management area
GIS	geographic information system
gpm	gallons per minute
HA	herd area
HMA	herd management area
IDT	BLM interdisciplinary team
KOP	key observation point
Kv	kilovolt
LADWP	Los Angeles Department of Water and Power
NDEP	Nevada Division of Environmental Protection
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NHT	National Historic Trail
NRHP	National Register of Historic Places
OHMA	other habitat management area
PEIS	programmatic environmental impact statement
PFY C	potential fossil yield classification
PHMA	priority habitat management area
PLPT	Pyramid Lake Paiute Tribe
Project	North Valley Geothermal Development Project at the San Emidio Geothermal Field

RMP	resource management plan
ROW	right-of-way
SEGU	San Emidio Geothermal Unit
SWReGAP	Southwest Regional Gap Analysis Project
US	United States
USACE	US Army Corps of Engineers
USC	United States Code
USFWS	US Fish and Wildlife Service
VRM	visual resource management
WSA	wilderness study area

Chapter I. Introduction

The United States (US) Department of the Interior (DOI), Bureau of Land Management (BLM) Black Rock Field Office (BRFO) has prepared this environmental assessment (EA) in accordance with the National Environmental Policy Act (NEPA), as implemented by the Council on Environmental Quality (CEQ) regulations and BLM regulations for implementing NEPA. The BLM also has prepared it in accordance with DOI Secretarial Order 3355 for streamlining NEPA.

I.1 PROJECT SETTING AND BACKGROUND

USG Nevada LLC, a subsidiary of Ormat Nevada, Inc. (hereinafter collectively referred to as Ormat), is proposing the North Valley Geothermal Development Project at the San Emidio Geothermal Field (Project). The Project is within an Area of Interest (AOI; see **Section 2.1.1**) in Washoe County and includes an associated overhead generation-tie (gen-tie) line that would cross portions of Churchill, Pershing, and Lyon Counties and connect with an existing substation near Fernley, Nevada. Collectively, the AOI and gen-tie right-of-way (ROW) make up the project area (**Appendix A, Figure A-1**, Project Area).

The Project proposes geothermal development in the San Emidio Geothermal Unit (SEGU; NVN-85820X), which encompasses approximately 20,400 acres of BRFO-administered public lands and private lands in the San Emidio Desert in Washoe County, Nevada, in all or portions of Sections 19-22 and 27-34, Township 30 North, Range 23 East, Sections 3-10, 15-22, and 27-34, Township 29 North, Range 23 East, Mount Diablo Baseline and Meridian. The unit covers federal geothermal leases NVN-42707, NVN-57437, NVN-63004, NVN-63005, NVN-63006, NVN-63007, NVN-74196, NVN-75552, and NVN-75557 (**Figure A-2**, Geothermal Leases).

The Project proposes to construct two closed-loop binary geothermal power plants, geothermal fluid production and injection wells, well pads, access roads, geothermal fluid pipelines, and ancillary support facilities (**Figure A-3**, Project Overview—San Emidio Geothermal Lease Unit). A 58-mile-long 120 kilovolt (kV) overhead gen-tie line with associated facilities is also proposed. The line would mostly parallel an existing 500 kV transmission line.

Existing and previous geothermal development activities in the San Emidio Desert, including BLM's establishment of the SEGU, is discussed in BLM's 2010 EA for the San Emidio Geothermal Exploration Project (BLM 2010, pp. 6-8). In summary, the San Emidio geothermal power plant and existing substation have been operating since 1988. Ormat previously constructed the AMOR II power plant, which is now decommissioned and has been removed. The existing San Emidio plant has a current design capacity of 11.8 megawatts. The purpose of the 2010 EA was to provide Ormat the opportunity to construct access roads, temporary pipelines, and well pads for exploration drilling activities that would allow them to test the geothermal reservoir and evaluate the geothermal power development potential of the resource. Existing facilities are depicted on **Figure A-4**, Existing Geothermal Utilization and Electrical Transmission Facilities—San Emidio Geothermal Unit.

As noted above, the proposed 120 kV gen-tie line would mostly parallel an existing 500 kV transmission line. This is the 846-mile Pacific DC Intertie, which distributes electricity from the Pacific Northwest to

the Los Angeles area using high voltage direct current. It originates near the Columbia River at the Bonneville Power Administration Celilo Converter Station near The Dalles, Oregon, and is connected to the Los Angeles Department of Water and Power (LADWP) Sylmar Converter Station north of Los Angeles. The section of line in Nevada and California is owned and operated by LADWP.

I.2 COOPERATING AGENCIES

The BLM invited the US Fish and Wildlife Service (USFWS), the Nevada Department of Wildlife (NDOW), the Pyramid Lake Paiute Tribe (PLPT), Washoe County, and the Truckee Meadows Regional Planning Agency to be cooperating agencies in preparing this EA. They were included because of their jurisdiction by law or special expertise. The USFWS, NDOW, PLPT, and Washoe County accepted the invitation to be cooperating agencies. The BLM is the lead federal agency in the NEPA process and for the Endangered Species Act (ESA) Section 7 consultation process and National Historic Preservation Act (NHPA) Section 106 consultation process.

I.3 PURPOSE AND NEED

The BLM's purpose for the federal action is to respond to Ormat's application to develop geothermal energy resources on public lands in the San Emidio Desert through the construction of geothermal power production facilities and to connect those facilities via transmission line to the Eagle Substation near Fernley, Nevada.

The need for action is established by the BLM's responsibility under the Mineral Leasing Act of 1920, the Geothermal Steam Act of 1970, and the implementing regulations provided under 43 Code of Federal Regulations (CFR) 3200. The need for action is also established by the BLM's responsibility to process a ROW application under the Federal Land Policy and Management Act of 1976 and ROW procedures at 43 CFR 2800.

I.4 DECISION TO BE MADE

The BLM would decide to grant, grant with modification, or deny Ormat's proposal, in compliance with BLM leasing regulations and other federal laws. Conditions of approval would be applied to the applicable permits and authorizations. Any activities outside the scope of the Proposed Action would be subject to further NEPA analysis.

I.5 RESOURCE MANAGEMENT PLAN CONFORMANCE

The Proposed Action, described below, would be in conformance with the BLM Winnemucca District Resource Management Plan (RMP; BLM 2015a), as amended. Specifically, the Proposed Action is consistent with Objective D-MR 4 (BLM 2015a, p. 2-172), which states, in part, that "Lands within the WD would be open to geothermal and oil and gas leasing and development except where incompatible with important resource values."

I.6 RELATIONSHIP TO LAWS, REGULATIONS, POLICIES, AND PLANS

The alternatives analyzed in this EA are consistent with federal laws and regulations; state and local government laws and regulations; and other plans, programs, and policies, to the extent practicable within federal law, regulation, and policy.

The BLM has prepared this EA in accordance with the following statutes and implementing regulations, policies, and procedures that govern the BLM's actions:

- Mineral Leasing Act of 1920 (30 United States Code [USC] 181), as amended
- Geothermal Steam Act of 1970 (30 USC 23), as amended
- The Federal Land Policy and Management Act of 1976 (43 USC 35)
- BLM NEPA Handbook (H-1790-1), as updated (BLM 2008)
- Energy Policy Act of 2005 (42 USC 149), as amended

I.7 SCOPING AND ISSUE IDENTIFICATION

The BLM received nine comment submissions during the public scoping period, which occurred from January 6, 2020, through February 10, 2020. Comments were submitted by the NDOW, Nevada State Clearinghouse, the PLPT, US Environmental Protection Agency, USFWS, Western Watersheds Project, and a private citizen. From these letters, there were 42 substantive comments. All comments received are summarized in the Public Scoping Report, which is available on the BLM project website (<https://bit.ly/38ShWp7>). Concurrent with public scoping, the BLM interdisciplinary team (IDT) and cooperating agencies held two internal scoping workshops to discuss issues to be carried forward for analysis in **Chapter 3**, Affected Environment and Environmental Consequences.

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Chapter 2. Proposed Action and Alternatives

2.1 ALTERNATIVE A: PROPOSED ACTION

Alternative A (the Proposed Action) includes construction and operation of two 20-megawatt, closed-loop binary geothermal power plants, geothermal fluid production and injection wells, well pads, access roads, geothermal fluid pipelines, ancillary support facilities, and an electrical substation. It also includes construction and operation of an overhead gen-tie power line with associated facilities that would connect the proposed electrical substation to the Eagle Substation near Fernley, Nevada. Unless otherwise noted, all information describing the elements of Alternative A other than the proposed gen-tie line and ROW are from the Project Utilization Plan (Ormat 2020); the details of the proposed gen-tie line and ROW are in Ormat's Plan of Development (Ormat 2019a).

2.1.1 Area of Interest

The AOI consists of approximately 3,938 acres of public lands administered by the BLM and private lands in the SEGU.

All proposed surface disturbance associated with project geothermal utilization components would be in the AOI. The AOI does not include proposed surface disturbance associated with the gen-tie line (see **Section 2.1.2, Gen-tie Line**). Proposed surface disturbance in the AOI would be associated with two new geothermal power plants, well pads, geothermal fluid pipelines, new and upgraded access roads, an aggregate pit, an electrical substation, and ancillary features, such as office buildings and storage facilities (see **Table 2-1**, below).

Table 2-1
Proposed Disturbance in the AOI

Component	Acre Disturbance	
	Temporary	Permanent
Power Plants ¹	30	30
Pipelines	36.8	18.4
Well Pads	105	63
Access Roads ²	13.1	13.1
Aggregate Pit	5	5
Total	189.9	129.5

Source: Ormat 2020

¹The substation and ancillary features, such as offices, restrooms, a control room, a maintenance building, and smaller auxiliary buildings, would be constructed within the power plants' footprints.

² Includes acres of disturbance from new roads and upgrades to existing roads.

2.1.1.1 Site Preparation

Site preparation would commence with grubbing and clearing the proposed areas of surface disturbance as summarized in **Table 2-1**. Following this, topsoil would be removed and stockpiled for later use in revegetation and reclamation. Subsequently, slopes would need to be cut, where necessary. As much as possible, native materials, derived from grading to balance cut and fill, would be used for site and road building. Approximately 100,000 cubic yards of surfacing material may be needed for power plant and

pipeline construction. Aggregate material would be obtained from an existing pit in the AOI (**Figure A-3**). The existing pit would be expanded by up to approximately 5 acres.

2.1.1.2 Geothermal Power Plants

The two proposed geothermal power plants would be located in Sections 16 and 21, Township 29 North, Range 23 East, Mount Diablo Baseline and Meridian. (**Figure A-3**), respectively. Each would be approximately 20-megawatt net rated (24-megawatt gross) geothermal power generation facilities. The combined footprint of the power plants would be approximately 30 acres.

An approximately 0.5-acre substation, used to transform generated low-voltage electrical power to the higher voltage required for a transmission line, would be constructed within the northern power plant boundary, or the existing substation from the decommissioned AMOR II Geothermal Power Plant would be expanded and upgraded. It would still be within the southern power plant boundary. The choice to locate the proposed substation at the northern or southern power plant would depend on which power plant was constructed first; the substation would be located at that plant. Whether the northern or southern plant was constructed first would depend on results of production and injection well performance and the expected balance of geothermal fluid production and injection when completed. A new control room, separate of the existing San Emidio control room, would be included in whichever power plant footprint is constructed first and would be staffed 24 hours a day, 7 days a week.

The power plants would use a binary design with an air-cooled heat rejection system. The geothermal fluids for the binary power plants would be pumped from the production wells (see **Section 2.1.1.3**, Well Field). Once delivered to the power plant, the heat in the geothermal fluid would be transferred to the binary (i.e., secondary) fluid in multiple-stage, noncontact heat exchangers. The binary turbine units would use pentane (C_5H_{12}), a flammable but nontoxic hydrocarbon, as the binary fluid, which would circulate in a closed loop. The heat from the geothermal fluid would vaporize the binary fluid, which would turn the binary turbine and generator to make electricity. Pentane containment failure and subsequent fire prevention measures will be included in the emergency action plan after engineering is completed. Pentane totals for the system also cannot be determined until engineering is complete. For context, Ormat's Tungsten Mountain geothermal plant, a 27-megawatt rated air-cooled binary design plant, contains 603,000 pounds of pentane in the system at any given time. Each of the proposed plants would likely contain similar amounts of binary fluid.

The vaporized binary fluid would exit the turbine and condense back into a liquid in a shell-and-tube, noncontact, air-cooled condenser. The condensed binary fluid would then be pumped back to the heat exchangers for reheating and vaporization, completing the closed cycle. The residual geothermal fluid from the heat exchangers would be pumped under pressure to the geothermal injection wells through the injection pipelines and then injected back into the geothermal reservoir. Before being reinjected, the water would be air-cooled using condensers, minimizing loss of water.

There would be no emissions of pentane to the atmosphere during normal plant operation. Some pentane emissions would occur due to the escape of binary working fluid from rotating seals and flanges on the heat exchangers and during maintenance on the binary power plant units (Ormat 2020).

Pentane emissions are estimated to average 12 tons per year per plant, which would be regulated through a permit issued by the Nevada Bureau of Air Pollution Control (Ormat 2020).

The most prominent features of the power plants, both in height and mass, would be the air-cooled condensers. Each plant would be 28–35 feet tall and approximately 1,300 feet long and 100 feet wide. The balance of the plant would be an array of pipes and a small building to house electrical equipment. The perimeter of the site and main facility areas would be fenced with chain link to prevent unauthorized entry, and to exclude wildlife from the facility and electrical generation area. The 8-foot chain-link fence would be topped with barbed wire and equipped with controlled-entry gates to allow vehicles onto the facility.

Ancillary facilities and power plant components that would be constructed on the power plant sites would be offices, restrooms, the electrical room and control room, the maintenance building, condensing fan equipment, and other smaller ancillary structures. If the existing electrical substation is used, it would be located within the footprint of the southern power plant.

All buildings, including those housing the offices, electrical room, control room, and auxiliary buildings would be rigid, steel-frame, pre-engineered structures with steel-panel walls and a steel roof. The buildings' exteriors would be painted consistent with BLM visual color guidelines to blend with surrounding areas.

Two 500-gallon diesel fuel and one 500-gallon unleaded gas, aboveground storage tanks would be within each power plant footprint. The diesel tanks would be used for backup generators, and the gasoline tanks would be used for fueling equipment. These tanks would be double-walled construction and placed in concrete secondary containment basins, which will follow a design criterion of 110 percent of the largest tank (in this case, 500 gallons) requiring containment. For on-site storage of diesel and gasoline, a spill prevention, control, and countermeasure plan would be developed, in accordance with 40 CFR 112, and authorized by the BLM (Ormat 2020). Prior to a formal notice to proceed from the BLM, Ormat would develop a formal emergency action plan for the facility (Ormat 2020).

2.1.1.3 Well Field

The number of geothermal production and injection wells required for the Project principally depends on the productivity (or injectivity) of the wells and the temperature and pressure of the produced geothermal fluid, which is composed of steam and water. Production wells flow geothermal fluid to the surface. Injection wells are used to inject geothermal fluid from the power plant into the geothermal reservoir, which produces geothermal fluid. Injection ensures the longevity and renewability of the geothermal resource by returning geothermal fluid back to the geothermal reservoir.

Ormat is proposing 25 production and injection wells, all located on public lands administered by the BLM in the AOI. **Figure A-3** shows the locations of these proposed production and injection wells. Exact well locations could be adjusted as additional geologic, geophysical, and geothermal reservoir information is obtained during the drilling of each well.

During normal well field operations, total geothermal fluid production rates are expected to be approximately 8,400 gallons per minute (gpm) at 320 degrees Fahrenheit. Individual production well flow rates are expected to be approximately 4,200 gpm, with a wellhead pressure of about 100 pounds per square inch. Geothermal fluid injection rates are approximately 7,740 gpm. Individual injection wells are expected to receive approximately 2,600 gpm of 135 degrees Fahrenheit geothermal fluid, with wellhead injection pressures of about 60 pounds per square inch.

Temporary surface disturbance for the 25 proposed well pads would be approximately 4.2 acres per pad, or approximately 105 acres in total. After interim reclamation, there would be approximately 2.5 acres of permanent disturbance at each well pad, or approximately 63 acres in total (see **Table 2-1**). See **Section 2.1.4, Reclamation**, for more details on interim reclamation.

Drill pad preparation would include clearing, earthwork, drainage, and other improvements necessary for efficient and safe operation and for fire prevention. Clearing before drilling would involve brush removal, which would either be taken to an appropriate dump site or piled and left on-site. Topsoil would be stripped, typically to the rooting depth, and salvaged during pad construction, as feasible. Salvaged topsoil and any cleared organic material, if saved, would be stockpiled on the pads for use during subsequent reclamation of the disturbed areas.

Each drill pad would be prepared to be level for the drill rig and a graded surface for the support equipment. Stormwater runoff from undisturbed areas around the drill pads would be directed into ditches surrounding the drill pad and back onto undisturbed ground, consistent with best management practices (BMPs) for stormwater. The site would be graded to prevent stormwater runoff from the pad. The site itself has been designed for a 100-year storm.

Reserve pits would be constructed on each pad for the containment and temporary storage of water, drill cuttings, and circulating drilling mud, in accordance with BMPs identified in the Gold Book (BLM and Forest Service 2007) and the NDOW's *Design Features and Tools to Reduce Wildlife Mortalities Associated with Geothermal Sumps*. Geothermal fluid produced from the well during flow testing (additional details on flow testing are provided below) would also drain to the reserve pit. The pits would be fenced once drilling has been completed to prevent access by people, wildlife, and livestock. The fence would remain in place until pit reclamation begins. For the drilling of each well, the reserve pit would measure approximately 75 feet wide by 200 feet long by 10 feet deep.

Wells would be completed at depths between 300 and 8,000 feet, with an average of approximately 3,500 feet deep. Casing depth would vary depending on the total depth of the well but would comply with Geothermal Resources Operational Order No. 2 and Nevada Department of Minerals requirements as applicable (Ormat 2020). Once a well is drilled and a wellhead completed, an industrial grate would be placed over the hole to prevent people and wildlife from falling into it. After interim reclamation is completed, the approximately 2.5-acre well pads would be fenced to limit access.

Each of the production wells would be equipped with a line shaft pump to bring the geothermal fluid to the surface under pressure. An insulated electric conductor installed from the power plant to the wellheads along the connecting pipelines would supply the electricity to the wellhead pump motors.

Wellhead dimensions for the production wells are not expected to exceed a height of 15 feet above the ground surface or 4 feet in diameter. Wellhead dimensions for the injection wells would be smaller (approximately 4 feet high); this is because they would not have wellhead pump motors.

An approximately 15-foot by 15-foot by 10-foot-high motor control building may be constructed on each well pad within approximately 50 feet of the production well. It would house and protect the auxiliary well control systems, motor switch gear controls and sensors, transmitters, and geothermal fluid treatment systems. The well control systems, data transmitters, and geothermal fluid treatment

systems used for the injection wells would be placed inside a smaller structure on the injection well pads.

Sensors would collect key temperature, pressure, and flow rate data from each well. These data would be measured for use in process control, resource data acquisition, safety, and environmental protection.

Short-Term Well Testing

One or more short-term flow test(s) of each well drilled would likely be conducted to estimate long-term well and geothermal reservoir productivity. Each test, lasting approximately 3 to 5 days, would consist of flowing the well into the reserve pit or portable steel tanks while monitoring geothermal fluid temperatures, pressures, flow rates, chemistry, and other parameters. Each short-term flow test is expected to discharge approximately 1.5 million gallons per well. Injectivity tests may also be conducted by injecting the produced geothermal fluid from the reserve pit or steel tanks back into the well and the geothermal reservoir.

Long-Term Well Testing

One or more long-term flow test(s) of each well drilled would likely be conducted following the short-term flow test(s) to more accurately determine long-term well and geothermal reservoir productivity. Each long-term flow test would last approximately 7–30 days, or potentially longer as determined by Ormat in coordination with the BLM. Each long-term flow test is expected to discharge approximately 15 million gallons.

The process would be conducted by pumping the geothermal fluids from the well through on-site test equipment to the reserve pit on the well pad, or the ground surface away from the well. The produced geothermal fluid would then be pumped through a temporary 8-inch to 10-inch-diameter pipeline to either inject the fluid into one of the other geothermal wells drilled within the project area, or to the ground surface in a direction that would not flow back to the well or facilities. The temporary pipeline would be carried by workers and hand-laid either “cross country” or on the surface of the disturbed shoulders on the access roads connecting the well pads. If required, roads would be crossed by either trenching and burying the temporary pipe or by elevating the pipe over the road using pipe ramps. The second option may be done because the shallow aquifer at the San Emidio geothermal field is not freshwater, but rather geothermal fluid (BLM 2020b).

Well testing would comply with the State of Nevada Underground Injection Control Program (Nevada Administrative Code 445A.908) administered by the Nevada Division of Environmental Protection. Injection and flow testing would also comply with other applicable state and federal permitting requirements, including the Nevada Division of Minerals Geothermal Permit.

2.1.1.4 Geothermal Fluid Pipelines

The geothermal fluid production and injection pipelines would bring the geothermal fluid from the production wells to the power plant and would deliver the cooled geothermal fluid from the power plant to the injection wells. Ormat proposes approximately 7.6 miles of production and injection pipeline routes. Pipes would have flow rates between 4,000 gpm and 25,000 gpm and diameters between 8 and 30 inches, depending on the wells they service (Ormat 2020). The maximum fluid pressure that could go through the system is dependent on the flow rate, but would be maintained and monitored throughout the system to prevent the fluid from changing to a gas in the pipelines.

During pipeline construction, approximately 36.8 acres of the surface would be temporarily disturbed (**Table 2-1**), assuming that an approximately 40-foot-wide construction corridor would be temporarily disturbed during installation. After interim reclamation, the permanent disturbance would be approximately 18.4 acres. This assumes an approximately 20-foot-wide corridor around the pipeline would be maintained.

The production and injection pipeline routes generally would follow the shortest distance from each well pad to the next well pad or the power plant. This would be done to minimize the amount of pipe required, to reduce heat losses and the power required to move the fluids, and to minimize the amount of ground disturbance. In addition, the proposed pipeline routes generally would follow existing or proposed roads to facilitate ongoing monitoring and future maintenance.

The final pipeline alignments would be dictated by the specific wells completed for the Project and the need to match fluid characteristics and balance fluid volumes in these pipelines. The pipelines would be painted to blend with the surroundings.

Construction would include drilling 24-inch-diameter holes to a 3- to 5-foot depth, at approximately 30-foot intervals. Steel pipe supports would be placed in the hole, which would then be filled with concrete to an elevation slightly above the ground. The supports would extend approximately 1 foot above the ground. When completed, the top of the new geothermal pipelines would average 3 feet above the ground; however, a number of pipeline lengths could be up to 6 feet above the ground to accommodate terrain undulations and to facilitate movement of wildlife and livestock through the well field.

2.1.1.5 North Valley Substation

Ormat proposes to locate the North Valley Substation at the northernmost end of the 120 kV gen-tie, next to the new power plant (see **Figure A-3**). The substation would be built within the power plant footprint. The gen-tie line would originate here. The proposed substation would have a fenced area of 250 feet by 175 feet; the proposed fence would be 8 feet tall.

Work at the substation site would begin by clearing vegetation and grading a level pad for installing the substation. Once the pad is prepared, the site would be secured with chain-link fencing. Holes for the structure footings and underground utilities would then be excavated. The footings and underground utilities would be installed, including electrical conduits and additions to the ground grid, and the excavations would be backfilled. Aboveground structures and equipment would then be installed.

Once the equipment is installed, gravel would be spread over the site to a depth of approximately 4 inches. The gravel would be obtained from within the boundaries of an existing lease, an existing aggregate pit, or from a private source near the project area.

2.1.1.6 Access Roads

New Access Roads

New access roads would be constructed using a dozer or road grader, or both. Approximately 4.2 miles of new access roads are proposed. The total estimated area of surface disturbance required for new access road construction, assuming a 25-foot-wide area of disturbance, would be approximately 12.8 acres (**Table 2-1**).

Access roads that cross drainages may require culvert installation. Installers would follow BLM design criteria and standards in the Gold Book (BLM and Forest Service 2007).

Existing Road Improvements

Approximately 0.5 miles of existing roads may be improved to facilitate Project access, including widening, grading, or blading. The total estimated area of surface disturbance required to improve existing access roads, assuming approximately 5 feet of disturbance along the road shoulders, is approximately 0.3 acres (**Table 2-1**).

2.1.1.7 Water Use

Construction

Approximately 50,000 gallons per day would be used during the first 2 months of construction for compaction and dust control, and 5,000 gallons per day would be used for dust control thereafter for approximately 6 months. This water would be supplied from geothermal fluid, the Sweetwater Well via a private ranch source, or one or more shallow water wells drilled from one or more of the proposed drill sites (Ormat 2020).

As necessary, a temporary construction water pipeline may be placed on existing and new access roads. No additional surface disturbance would be required for this feature.

Operation

Facility operation would use up to approximately 325 gallons per day, or 0.37 acre-feet per year. This water would be obtained from the off-site sources identified above and would be trucked to the power plants and stored on-site. Drinking water would be purchased from a commercial bottled water source.

2.1.1.8 Personnel

Construction

Project construction would likely require a maximum of 50 workers. After grading and excavation, this would drop to an average of 3 to 4 workers.

Operation

Once operating, the Project would have a staff of approximately 15 to 20. The power plant would be staffed, and approximately 1 to 2 employees may be on-site at a given time.

2.1.1.9 Schedule

Project construction would take approximately 8 months and is anticipated to begin in the third quarter of 2020. Commercial operations are anticipated to begin in 2021. The estimated Project lifespan is 50 years.

2.1.2 Gen-tie Line

Electricity generated from the Project would be connected to the NV Energy power grid via a proposed 58-mile-long overhead 120 kV gen-tie line. The gen-tie line would connect from the North Valley Substation to the existing Eagle Substation near Fernley, Nevada. The gen-tie line route would cross approximately 40 miles of BLM-administered lands and 18 miles of private land. The route would parallel an existing alignment of the LADWP's 500 kV direct current transmission line and would be within a

designated utility corridor per the Winnemucca RMP (BLM 2015a) and west-wide energy corridor per Section 368 of the Energy Policy Act of 2005.

The gen-tie would consist of a single 120 kV circuit on direct-buried and guy-wired, wood, H-frame, and three-pole structures. All structures would be preassembled, and insulators would be attached to the pole before installation. A truck-mounted crane would lift and set the structure after it is assembled.

The gen-tie would consist of a single conductor, using aluminum-conductor, steel-reinforced cable; one 0.375-inch steel-shield wire; and one optical ground wire. The overhead conductors would be of a material that would reduce sunlight reflection and minimize their visibility.

Each structure would carry a shield wire and an overhead ground wire/fiber-optic cable for lightning protection and fiber-optic communications. The overhead ground wire would be approximately 0.5 inches in diameter and would be constructed of concentric layers of galvanized steel wires surrounding a hollow core, which would contain 12 to 48 fiber-optic strands (depending on final requirements). Metering and communications equipment would be required at the generator site. **Table 2-2** provides a summary of the gen-tie components.

Table 2-2
Gen-Tie Summary

Component	Description
Length	57.7 miles
Pole structure type	Wood H-frame, direct embedded
Structure height	52 to 79 feet above ground level (60- to 90-foot pole length)
Structure base diameter	1.5 to 2 feet
Average span length	960 feet (100 feet minimum to 2,000 feet maximum)
Number of structures per mile	5.5
ROW width	300-foot-wide ROW (a 100-foot permanent ROW with an extra 200-foot temporary ROW for construction), plus an additional 50 feet (100-foot radius) on the guy wire side of the outermost line angle pole for anchor easements
Voltage	120 kV
Conductor ground clearance	Minimum 21 feet above ground level

Source: Ormat 2019a

In order to accommodate gen-tie construction equipment and activities, temporary work areas, approximately 300 feet by 300 feet, would be necessary at each gen-tie structure site. Several stringing sites and angle points, which would each have an area of approximately 300 by 300 feet, would also be necessary to install the conductor for the 120 kV gen-tie. Stringing sites would be located approximately every 10,000 to 15,000 feet along the gen-tie.

Temporary material storage yards would be required for gen-tie construction materials. These staging areas would be located at existing well pads or the power plant site at the gen-tie northern end. Construction water would be obtained as described in **Section 2.1.1.7, Water Use**, above.

To establish work areas where poles and conductors would be installed, vegetation clearing and grading within the ROW could be necessary. In all locations, Ormat would use overland travel to the extent possible and would minimize vegetation removal to the extent possible. In order to stage equipment and

conduct work, the structure access, work areas, and the stringing sites would require a relatively flat surface; therefore, the areas could be graded, and gravel or soil could be imported to achieve the necessary elevation. Proposed work areas would be located away from potentially sensitive sites and would be approved by the BLM Authorized Officer prior to work beginning in these areas.

After construction, the temporary work areas would be reclaimed and restored, with the exception of a 20-foot by 30-foot pad, which would be used for future maintenance on gen-tie infrastructure. The temporary work areas would be revegetated, as described in **Section 2.1.4, Reclamation**. After gen-tie construction is complete, all roads would be left in a condition equal to or better than their preconstruction condition, as directed by the BLM and as applicable.

In accordance with the Federal Land Policy and Management Act and a Nevada BLM Instruction Memorandum, electric transmission and distribution facility ROW holders have the authority to conduct routine operations and maintenance activities within their ROW (see 43 CFR 2805.14(a)). ROW holders must also do everything reasonable to prevent and suppress wildfires within or near the ROW area, 43 CFR 2805.12 (a)(4), and comply with project-specific terms, conditions, and stipulations, including any requirements to control or prevent damage to property, and public health and safety 43 CFR 2805.12(a)(8)(iii).

Wildfire risk management strategies incorporated within the proposed ROW would include vegetation management within 4 feet surrounding all power poles. This would primarily include the periodic trimming of shrubs through manual methods and treatment of annual grasses using manual or herbicide treatments. Any chemical treatments would be consistent with the BLM's 2007 Final Programmatic Environmental Impact Statement National Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron (Final PEIS) on BLM Lands (BLM 2007). There would be no mechanical treatments, prescribed fire, or targeted grazing. Treatments would take place concurrent with regular ROW maintenance, or more frequently as warranted by vegetation conditions and potential wildfire risk.

Should the geothermal plant be decommissioned and the interconnection no longer be needed, the gen-tie, including support structures, would be removed and all disturbed areas would be reclaimed, as described in **Section 2.1.4**. As with construction, decommissioning would be accomplished using overland travel, and no new routes would be created.

2.1.3 Applicant-Committed Environmental Protection Measures

All construction, operation, and maintenance in the AOI and for the proposed gen-tie would be conducted in compliance with all relevant federal, state, and local regulations and permits. They also would be conducted in accordance with the requirements and conditions specified in the NEPA decision record and BLM ROW grant for the gen-tie. In addition to these requirements, Ormat has committed to implementing environmental protection measures to further avoid or minimize potential adverse environmental impacts. These measures are summarized below.

Prevent or Control Fire

Ormat would equip all construction and operating equipment with applicable exhaust spark arresters. Fire extinguishers would be available on-site. Water that is used for construction and dust control would be available for firefighting. Personnel would be allowed to smoke only in designated areas.

Ormat has prepared a fire contingency plan (**Appendix B**) should a fire start in the AOI or along the gen-tie.

Prevent Soil Erosion and Noxious Weeds

Ormat would follow BLM stormwater BMPs, as applicable, on public lands, as described below.

Cut and fill activities would be minimized when selecting the power plant site and pipeline routes. Off-site stormwater would be intercepted in ditches and channeled to energy dissipaters as necessary to minimize erosion around the power plant. To minimize erosion from stormwater runoff, access roads would be maintained, consistent with road development BMPs.

Before construction, Ormat would submit an invasive plant management plan to the BLM to monitor and control noxious weeds. To prevent the spread of invasive, nonnative species, all contractors would be required to power wash their vehicles and equipment, including the body and undercarriage, before bringing them onto BLM-administered lands. All gravel and fill material used would be certified as weed free.

Protect Surface Water and Groundwater

Geothermal fluids would not be discharged to the ground under normal operating conditions. Controls such as frequent inspections, ultrasonic pipeline testing, flow and pressure monitoring, and well pump and pipeline valve shutdown features would minimize the potential for accidental discharges of geothermal fluids. A spill prevention, control, and countermeasure plan would also be developed (**Appendix B**).

Protect Wildlife

Ormat would commit to conducting pre-construction biological surveys to supplement those conducted for the biological baseline report (see Section 3.1.2 of BLM 2020a). If pre-construction surveys indicate the presence of the same species of concern as documented in the biological baseline report, then the same measures to avoid, minimize, or mitigate impacts would be applied.

If pre-construction surveys indicate the presence of a species of concern not already documented in the report, then additional NEPA documentation would occur. Measures to avoid, minimize, or mitigate impacts would be developed during that NEPA process.

Temporarily disturbed areas would be reclaimed as soon as is feasible. Revegetation and periodic maintenance would prevent erosion and protect habitat. Suitable, BLM-approved revegetation methods would be used. Topsoil would be stockpiled and applied to enhance revegetation success.

To prevent undue degradation and the removal of habitat, cover, and food, existing roads would be used whenever possible; cross-country travel would be restricted to designated construction areas.

Power plant sites, permanent well pads, and pits would be fenced to prevent wildlife entry and reserve pits would be operated in accordance with the NDOW's *Design Features and Tools to Reduce Wildlife Mortalities Associated with Geothermal Sumps*. Wellhead cellars would be covered by industrial grates to prevent wildlife entry and entrapment.

Effects on golden eagles would be avoided by implementing measures described in the project's USFWS-approved eagle plan. The plan would be approved by the USFWS before construction begins on the proposed gen-tie. The draft plan is included as **Appendix D** of this EA.

The proposed gen-tie would comply with raptor protection standards described in the Suggested Practices for Raptor Protection on Power Lines, The State of the Art in 2006 (APLIC 2006). All power poles would be equipped with BLM-approved raptor deterrents.

Ormat would minimize construction noise by avoiding or minimizing actions that may typically generate greater noise levels or generate distinctive impact noise.

Protect Cultural Properties and Visual Resources

All National Register of Historic Places (NRHP)-eligible and unevaluated resources would be avoided. Employees, contractors, and suppliers would be instructed that all cultural resources are protected, and that if previously undiscovered resources are encountered, they will be left in place and reported to the responsible Ormat representative.

The paint used on the power plant, pipelines, wellheads, pump motors, and motor control buildings would be consistent with BLM visual guidelines to blend with the area and minimize their visibility. The overhead conductors used on the gen-tie power poles would have a matte surface to reduce sunlight reflection and glare.

Minimize Air and Noise Pollution

Ormat would comply with air quality requirements prescribed by the Nevada Department of Environmental Protection, Bureau of Air Pollution Control. Fugitive dust control measures include compacting construction-disturbed areas, placing gravel on access roads, and watering construction areas. Ormat would use state-of-the-art equipment and design to ensure minimal pentane emissions during plant construction. Ormat does not anticipate emissions during normal plant operation.

Ormat would use mufflers on all drilling rig engines to reduce noise generation. Operational practices to avoid or minimize high noise level generation or distinctive noise impacts would be used.

Minimize Hazards to Public Health

Ormat would conduct construction and operation in a manner to avoid creating any hazards to public health and safety. The project is remotely located and would not likely be hazardous to public health and safety. A power plant operations and maintenance manual would be developed in parallel with site construction. This manual would be available on-site once the plant commences operations.

Ormat has prepared a spill or discharge contingency plan that addresses potential sources of accidental spills or discharges. It also includes a plan for cleanup and abatement (**Appendix B**).

2.1.4 Reclamation

Once drilling is complete, approximately half of the drill pad area would be reclaimed. The remaining half, typically including the drill sump, would be kept clear for ongoing operations and the potential need to work on or re-drill the well. Areas to be reclaimed would be recontoured to a final or intermediate contour that would blend with the surrounding topography to the extent possible. Areas to be

reclaimed would be ripped, tilled, or disked on contour, as necessary; stockpiled topsoil would be applied. A BLM-approved seed mixture would be applied.

At the end of operations, wells would be plugged and abandoned, as required by Nevada Division of Mineral regulations. Abandonment typically involves filling the well bore with clean, heavy abandonment mud and cement, until the top of the cement is at ground level. The wellhead and other surface equipment would then be removed, the well casing would be cut off well below ground surface, and the hole would be backfilled to the surface. As described above, the surface would be reclaimed.

Road reclamation would involve recontouring the roads back to the original contour and seeding with a BLM-approved seed mix. Other techniques to improve reclamation success, such as ripping, scarifying, replacing topsoil, pitting, and mulching, may be conducted if determined necessary.

Pipeline reclamation would include removing all pipeline and supports, and breaking up and burying support foundations in place. As described above, the surface would be reclaimed.

Ormat would completely remove all other aboveground facilities from the site, and would break down concrete foundations and bury them in place. As described above, the surface would be reclaimed.

Ormat would attempt to close or restrict vehicle access to areas that have been seeded until reclamation success criteria have been achieved. Stormwater diversion measures would remain in place until successful revegetation is attained.

2.2 ALTERNATIVE B: NO ACTION ALTERNATIVE

Under Alternative B, the No Action Alternative, the BLM would not approve the application by Ormat to construct and operate two power generation facilities with associated production and injection wells, access roads, geothermal fluid pipelines, and ancillary support facilities, and a 58-mile-long overhead 120 kV transmission line on public lands.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

No alternatives other than Alternative A, the Proposed Action, and Alternative B, the No Action Alternative, were proposed during public scoping; however, during internal scoping and issues development, the BLM considered alternative alignments for the proposed gen-tie.

One alternative considered locating the line parallel to an existing power line that crosses the Pyramid Lake Paiute Tribe Reservation. This alternative was eliminated from detailed analysis because it would have increased the potential for impacts on cultural and tribal resources in the reservation.

Another alternative considered locating the line outside of ROW avoidance area in the Nightingale Mountains. This alternative was eliminated from detailed analysis because it would have required locating the proposed gen-tie outside of a designated utility corridor.

Chapter 3. Affected Environment and Environmental Consequences

3.1 INTRODUCTION

This chapter describes the affected environment, which is the existing or baseline conditions relevant to each issue identified during scoping. Following the affected environment is a description of the direct and indirect effects relative to each issue; these effects are analyzed under both Alternative A, the Proposed Action, and Alternative B, the No Action Alternative. The cumulative effects of Alternative A and Alternative B are described following the analysis of the direct and indirect effects.

3.1.1 Supplemental Authorities and Resource Areas Considered

The CEQ regulations under 40 CFR 1500 and the BLM NEPA Handbook require that the BLM identify significant issues for analysis and focus only on those issues. The BLM NEPA Handbook defines an issue as, “a point of disagreement, debate, or dispute with a proposed action based on some anticipated environmental effect (BLM 2008, page 40). In addition, an issue: has a cause and effect relationship with the proposed action and alternatives; is within the scope of analysis; has not be [sic] decided by law, regulation, or previous decision; and is amenable to scientific analysis rather than conjecture (BLM 2008, page 40).”

For this project, the issues identified during scoping and carried forward for analysis include those elements of Alternative A that would cause or have the potential to cause significant environmental effects. This chapter provides an analysis of identified issues and the resources affected by those issues. **Table 3-1**, below, provides a summary of issues and affected resources. Resources not significantly affected under Alternative A are summarized in **Table 3-2**.

Table 3-1
Supplemental Authorities and Resource Areas Analyzed by Issue

Issue Number	Issue Statement	Supplemental Authorities and Resource Areas Analyzed
1	How would ambient noise levels change, and what would be the effect on sensitive resources?	Migratory Birds;* Range; Recreation; Wild Horses and Burros; Wildlife (General and Sensitive Species)
2	How would geothermal fluid utilization affect geology, water resources, and use of water rights?	Environmental Justice;* Geology and Soil Resources; Range; Socioeconomics; Water Resources–Surface and Ground;* Wild Horses and Burros; Wildlife (General and Sensitive Species)
3	How would sensitive resources be affected by surface disturbance during construction, operations, and maintenance?	Cultural;* Geology and Soil Resources; Migratory Birds;* Native American Religious Concerns;* Range; Recreation; Socioeconomics; Vegetation and Invasive, Nonnative Species; Visual Resources; Water Resources–Surface and Ground;* Wilderness Study Areas; Wild Horses and Burros; Wildlife (General and Sensitive Species)
4	How would the physical presence and design of the proposed infrastructure influence resources and resource use conditions?	Cultural;* Migratory Birds;* Native American Religious Concerns;* Range; Land Use and Infrastructure; Recreation; Visual Resources; Wilderness Study Areas; Wild Horses and Burros; Wildlife (General and Sensitive Species)

*Indicates supplemental authority (see BLM NEPA Handbook H-1790-1)

Table 3-2
Resource Effects Determination and Rationale for Analysis

Supplemental Authority^a or Other Resource Area	Issue 1	Issue 2	Issue 3	Issue 4
Air*	<p>Present/Not Affected^b This EA incorporates by reference the best management practices and mitigation measures contained in Appendix D of the Geothermal PEIS (BLM and Forest Service 2008), including those for air quality and climate. These include an air quality monitoring plan (page D-6) and equipment emissions mitigation plan (pages D-10 and D-11). Additional measures for roads and pads (page D-6, D-14) and traffic management (page D-14) would minimize fugitive dust emissions. Further, Ormat would continue to maintain its Surface Area Disturbance permit with the Nevada Department of Environmental Protection, Bureau of Air Pollution Control (NDEP BAPC), and continue to implement the required actions to minimize fugitive dust emissions. These measures would mitigate or avoid air quality impacts from ground-disturbing activities and equipment operations associated with Alternative A. See analysis for Issue 3 (Section 3.3.4) for more information.</p> <p>The proposed binary turbine power plants would use pentane (C₅H₁₂), a flammable but non-toxic hydrocarbon, as the binary fluid, which circulates in a closed loop. During normal operations and maintenance, an average of approximately 12 tons/year of pentane per plant would be released into the atmosphere. Releases would be regulated through a Class II permit issued by NDEP BPAC, to ensure emissions do not result in ambient concentrations of ozone (which can be created from the reaction of ambient concentrations of hydrocarbons and nitrogen oxides) in excess of the applicable Ambient Air Quality Standards (Ormat 2020). Thresholds for Class II permits are less than 100 tons per year for any one regulated pollutant. This would mitigate or avoid air quality impacts from equipment operations and maintenance associated with Alternative A.</p>			
Cultural Resources*	<p>Present/Not Affected Changes in ambient noise levels from the project would not affect known cultural sites in the vicinity of the project.</p>	<p>Present/Not Affected Geothermal fluid utilization would not affect known cultural sites in the vicinity of the project.</p>	<p>Present/May be Affected^c Carried forward in Section 3.3.4.</p>	<p>Present/May be Affected Carried forward in Section 3.3.5.</p>
Environmental Justice*	<p>Present/Not Affected Based on a review of US Census Bureau data (US Census Bureau 2019a) for the Project Area counties, no minority or low-income populations would be disproportionately affected by noise under Alternative A.</p>	<p>Present/May be Affected Carried forward in Section 3.3.3</p>	<p>Present/Not Affected Based on a review of US Census Bureau data (US Census Bureau 2019a) for the Project Area counties, no minority or low-income populations would be disproportionately affected by the construction, operation, maintenance, or physical presence of the proposed infrastructure associated with Alternative A.</p>	

Supplemental Authority ^a or Other Resource Area	Issue 1	Issue 2	Issue 3	Issue 4
Fish Habitat*	Present/Not Affected The nearest fish habitat is in the Truckee River, which is approximately 3.8 miles from the southern portion of the proposed gen-tie. Alternative A would have no potential to affect water resources and associated fish habitat in the Truckee River. Pyramid Lake, which contains federally threatened Lahontan Cutthroat Trout and cui-ui, is approximately 12 miles south of the AOI. The Hydrogeologic Evaluation (BLM 2020b) indicates that the groundwater systems in the San Emidio Desert and Pyramid Lake Basin are not interconnected. Geothermal fluid flows northward following fault structures along the eastern boundary of the San Emidio Valley. Accordingly, Alternative A would have no potential to affect water resources and associated fish habitat in Pyramid Lake.			
Forests and Rangelands*	Not Present There are no US Forest Service-managed forests or rangelands in or near the project area. The nearest US Forest Service-managed lands, on the Humboldt-Toiyabe National Forest, are over 30 miles from the project area.			
Floodplains*	Not Present There are no FEMA 100-year flood zones in the project area.			
Geology and Soil Resources	Present/Not Affected Not applicable to this issue	Present/May be Affected Carried forward in Section 3.3.3	Present/May be Affected Carried forward in Section 3.3.4	Present/Not Affected Not applicable to this issue
Land Use and Infrastructure	Present/Not Affected Alternative A would result in the issuance of a ROW for a new transmission line. The BLM would process the request for an SF 299 Permit consistent with agency policies. There would be no changes in land uses or ownership as part of Alternative A.			Present/May be Affected Carried forward in Section 3.3.5 .
Lands with Wilderness Characteristics	Present/Not Affected Two areas with wilderness characteristics are in the vicinity of the proposed gen-tie in southwestern Pershing County: the North Shawave Mountains, and Bluewing Mountains (BLM 2015). The nearest portions of these areas to the project area are 4.5 miles and 12 miles away, respectively. Given the distance between these areas and the project area, any potential impacts would be small enough to be discountable.			
Migratory Birds*	Present/May be Affected Carried forward in Section 3.3.2	Present/May be Affected Carried forward in Section 3.3.3	Present/May be Affected Carried forward in Section 3.3.4	Present/May be Affected Carried forward in Section 3.3.5

Supplemental Authority^a or Other Resource Area	Issue 1	Issue 2	Issue 3	Issue 4
Native American Religious Concerns*	Present/Not Affected Changes in ambient noise levels would be localized. Noise from construction and operation would attenuate rapidly from the noise source, which would result in negligible effects on Native American Religious Concerns.	Present/Not Affected The Hydrogeologic Evaluation (BLM 2020b) indicates that geothermal systems in the San Emidio Desert and Pyramid Lake Basin are not interconnected. Geothermal fluid flows northward following fault structures along the eastern boundary of the San Emidio valley. Accordingly, geothermal fluid utilization would not affect Native American Religious Concerns associated with the Pyramid Lake Paiute Tribe, or other Federally-recognized tribe.	Present/May be Affected Carried forward in Section 3.3.4.	Present/May be Affected Carried forward in Section 3.3.5.
Noise	Present/May be Affected Carried forward in Section 3.3.1	Present/Not Affected Not applicable to this issue	Present/Not Affected Not applicable to this issue	Present/Not Affected Not applicable to this issue
Paleontological Resources	Not Present The project area is composed of areas of potential fossil yield classification (PFYC) 1 and 2. PFYCs and recommended management actions for each class are described in the BLM Instruction Memorandum 2016-124. In summary, in these classes, management concerns for paleontological resources are generally nonexistent to low, and further assessment and paleontological mitigation is usually unnecessary.			
Prime or Unique Farmlands	Present/Not Affected Approximately 150 acres of the project area, the Mazuma association, is classified as prime farmland if irrigated and reclaimed of excess salts and sodium (NRCS 2019). No agricultural activities occur in this area. Alternative A could result in conversion to non-farmland, occupied by well pads and access roads, but this would be a small percentage of potential prime farmland in the project area. Further, areas between well pads and access roads could be available for farming, and Alternative A in general would be compatible with agriculture uses and would not reduce opportunities to implement agricultural practices on the remaining prime farmlands.			

Supplemental Authority ^a or Other Resource Area	Issue 1	Issue 2	Issue 3	Issue 4
Range	Present/May be Affected Carried forward in Section 3.3.2	Present/May be Affected Carried forward in Section 3.3.3	Present/Not Affected Dust and isolated soil erosion from surface disturbance would not affect livestock grazing.	Present/Not Affected The placement of infrastructure in the Blue Wing/Seven Troughs, Desert Queen, and Rodeo Creek grazing allotments would displace livestock from those areas. The amount of displacement accounts for approximately 0.0001 percent of the land area in the allotments and would therefore have a negligible effect on grazing opportunities.
Recreation	Present/Not Affected Noise effects would only apply to areas surrounding the AOI. The absence of recreation activity in the San Emidio Desert would result in no effect on recreation.	Present/Not Affected Not applicable to this issue	Present/May be Affected Carried forward in Section 3.3.4	Present/May be Affected Carried forward in Section 3.3.5
Socioeconomics	Present/Not Affected Not applicable to this issue	Present/May be Affected Carried forward in Section 3.3.3	Present/May be Affected Carried forward in Section 3.3.4	Present/Not Affected Not applicable to this issue
Vegetation and Invasive, Nonnative Species	Present/Not Affected Not applicable to this issue	Present/Not Affected Not applicable to this issue	Present/May be Affected Carried forward in Section 3.3.4	Present/Not Affected Not applicable to this issue
Visual Resources	Present/Not Affected Not applicable to this issue	Present/Not Affected Not applicable to this issue	Present/May be Affected Carried forward in Section 3.3.4	Present/May be Affected Carried forward in Section 3.3.5
Wastes, Hazardous or Solid*	Present/Not Affected An average of approximately 12 tons of pentane per plant would be released into the atmosphere annually during power plant operation and maintenance; releases are regulated under a permit from the NDEP BAPC (UGS Nevada LLC 2019). The project would not utilize or generate any other hazardous or solid wastes, and no other hazardous wastes or hazardous materials are known to occur in or near the project area.			

Supplemental Authority ^a or Other Resource Area	Issue 1	Issue 2	Issue 3	Issue 4
Water Resources—Surface and Ground*	Present/Not Affected Not applicable to this issue	Present/May be Affected Carried forward in Section 3.3.3.	Present/May be Affected Carried forward in Section 3.3.4.	Present/Not Affected Not applicable to this issue
Wetlands – Riparian Zones*	Not Present A project area habitat inventory (BLM 2020a) determined that wetlands and riparian areas are not present.			
Wild and Scenic Rivers*	Not Present The nearest Wild and Scenic River, the Feather River in Lassen and Plumas Counties, California, is over 50 miles from the project area.			
Wilderness*	Not Present The nearest designated Wilderness is the BLM-managed Calico Mountains Wilderness, approximately 40 miles north of the project area.			
Wilderness Study Areas	Present/May be Affected Carried forward in Section 3.3.2	Present/Not Affected Not applicable to this issue	Present/May be Affected Carried forward in Section 3.3.4	Present/May be Affected Carried forward in Section 3.3.5
Wild Horses and Burros	Present/May be Affected Carried forward in Section 3.3.2	Present/May be Affected Carried forward in Section 3.3.3	Present/May be Affected Carried forward in Section 3.3.4	Present/May be Affected Carried forward in Section 3.3.5
Wildlife (General)	Present/May be Affected Carried forward in Section 3.3.2	Present/May be Affected Carried forward in Section 3.3.3	Present/May be Affected Carried forward in Section 3.3.4	Present/May be Affected Carried forward in Section 3.3.5
Wildlife (Sensitive Species)	Present/May be Affected Carried forward in Section 3.3.2	Present/May be Affected Carried forward in Section 3.3.3	Present/May be Affected Carried forward in Section 3.3.4	Present/May be Affected Carried forward in Section 3.3.5
Wildlife (Threatened or Endangered Species)*	<p>Not Present No threatened, endangered, candidate, or proposed species or designated critical habitat are present in or near the project area and would therefore not be affected by Alternative A (BLM 2020a).</p> <p>There were concerns raised during scoping regarding the potential connectivity of the San Emidio geothermal reservoir and surface water in Pyramid Lake and that Alternative A could affect Lahontan cutthroat trout and cui-ui in Pyramid Lake. See analysis for Issue 2 (Section 3.3.3) and the Hydrogeologic Evaluation (BLM 2020b), which indicate that geothermal fluid flows northward following fault structures along the eastern boundary of the San Emidio Valley and there is no connectivity between the San Emidio geothermal reservoir and Pyramid Lake. Accordingly, Alternative A would have no potential to affect threatened or endangered species in Pyramid Lake or the Truckee River.</p>			

^a See BLM Handbook H-1790-I (BLM 2008), Appendix I, Supplemental Authorities to be Considered.

^b Supplemental authorities that are determined to be not present or present/not affected need not be carried forward or discussed further in the document.

^c Supplemental authorities that are determined to be present/may be affected must be carried forward in the document.

*Indicates Supplemental Authority

3.2 AFFECTED ENVIRONMENT

3.2.1 Water Resources

The project area hydrologic setting is described in detail in the Hydrogeologic Evaluation (BLM 2020b). Brief summaries of descriptions of the project area water budget, surface water and groundwater resources, existing wells, and potentially jurisdictional waters are included below.

Water Budget

The San Emidio Desert and the surrounding mountains experience extreme temperatures and receive little precipitation. As described in the Hydrogeologic Evaluation (BLM 2020b), annual total precipitation (rainfall and snowmelt) averages 8.25 inches and generally occurs throughout the year. Based on data from Gerlach, which is 15 miles away and has similar topographic and climate conditions, the evapotranspiration rate in the San Emidio Desert is estimated to be 4.2 inches per year. In contrast to annual precipitation rates in Gerlach, San Emidio Desert discharge due to evaporation is less than recharge due to precipitation.

The sediments in the center of the valley floor likely receive recharge from the alluvial deposits and from flooding of playa sediments after runoff events. Groundwater is discharged naturally through fine-grained sediments by deep-rooted vegetation and evaporation from bare soil. Groundwater is primarily used for industrial and mining processes and irrigation, which total approximately 7,186 acre-feet per year of discharge in the San Emidio Desert basin. It is also used in lesser amounts (approximately 110 acre-feet per year) for municipal and stock water purposes. These data are based on allocated water rights. It can be inferred that the excess of recharge due to precipitation is counterbalanced by discharge due to groundwater uses and water uptake by vegetation. The perennial yield of the San Emidio Desert basin is 4,600 acre-feet per year.

Surface Water

Three springs are present within 5 miles of the AOI. These include Rodeo Creek, Chimney Spring, and Painted Rock Spring. Surface water may also be briefly present in ephemeral drainages and has the potential to pond on the San Emidio Desert playa and valley floor.

Sage Hen Springs, located over 20 miles southwest of the AOI in the Nightingale Mountains, and approximately 1 mile west of the gen-tie, is used by wild horses and burros.

Groundwater

The Basin and Range Province is a range-to-valley flow system. This means aquifer heads are typically highest in the ranges and lowest in the valleys; similarly, there is more recharge in the ranges and more discharge in the valleys (Blackwell 1983).

As described in the Hydrogeologic Evaluation (BLM 2020b), in the AOI, thermal water flows upward until it encounters impermeable volcanic rock, forcing it to flow laterally to the northwest. Thermal waters then encounter Tertiary sands, causing it to flow both westward and upward and mix with cold groundwater. Eventually it encounters an impermeable silica caprock, which forces the thermal waters outward into a shallow outflow zone. Evidence of hydrothermal alteration suggests this outflow zone occurs at a depth between approximately 115 and 328 feet below the ground surface. Within this zone, thermal water flows north toward the Black Rock Desert.

Water Wells

There are 10 identified water wells within 5 miles of the AOI, as shown in the Hydrogeologic Evaluation (BLM 2020b). These water wells are currently designated for industry, testing, monitoring, irrigation, municipal, and domestic uses (NDWR 2020).

Jurisdictional Water

Surface water may be briefly present in ephemeral drainages originating in the Lake Range and flowing into the AOI. Surface water also has the potential to pond on small playa features in the AOI, on the floor of the San Emidio Desert. Further, according to the USFWS National Wetland Inventory, approximately 115 acres of freshwater emergent wetlands may be present on the floor of the San Emidio Desert, west of the AOI. These areas may be considered jurisdictional Wetlands and Other Waters of the US by the US Army Corps of Engineers (USACE), potentially placing them under USACE jurisdiction under Section 404 of the Clean Water Act; however, coordination with the USACE would be necessary to determine the jurisdictional status of this area.

3.2.2 Geology

The geologic setting is described in detail in the Hydrogeologic Evaluation (BLM 2020b). A summary of the geologic setting in the AOI is included below.

The Project is located within the Basin and Range physiographic province of northwestern Nevada. This province is characterized by north- or northwest-trending mountain ranges, which are bounded by faults against adjacent basins.

The San Emidio Desert is bounded by the Fox Range to the west and the northern Lake Range to the east, and occurs within a north-trending, right-step (extension) normal fault system. The San Emidio fault, Empire fault, and Lake Range fault are three major faults that occur in the vicinity of the AOI. These faults are north-northeast striking with subsurface conditions characteristic of hydrothermal alteration. The San Emidio fault and the Emidio fault intersect each other within the AOI, where fracturing and permeability are especially high, making ideal conditions for hydrothermal alteration and flow.

Surface geology in the AOI includes middle to late Miocene volcanic rocks and late Miocene to recent sediments, all overlying Mesozoic metasedimentary rocks. These Tertiary volcanic and sedimentary rocks are overlain with Quaternary alluvium and lacustrine deposits ranging from Pleistocene Lake Lahontan sediments to current deposits. Basement rock is a thick and folded Triassic-Jurassic Nightingale Sequence, consisting of clay-rich and low-grade Mesozoic metasedimentary rocks with felsic (rich in feldspar and silicon) intrusions.

3.2.3 Vegetation

General Vegetation Communities

As described in the biological baseline report (BLM 2020a), there are 10 Southwest Regional Gap Analysis Project (SWReGAP) land cover types in the project area. **Table 3-3** summarizes acres and provides a brief description of each type. A map of land cover types and representative photographs of the land cover types are in the biological baseline report (BLM 2020a).

Table 3-3
Vegetation

SWReGAP Cover Type	Description	Acres¹
Invasive Annual Grassland	Areas that are dominated by introduced annual grass species, such as cheatgrass (<i>Bromus tectorum</i>) and others.	1,893.7
Intermountain Basins Mixed Salt Desert Scrub	Open-canopied shrublands of typically saline basins, alluvial slopes, and plains. Vegetation composed of one or more <i>Atriplex</i> species, such as shadscale or fourwing saltbush. Other shrubs present to co-dominate may include Wyoming big sagebrush (<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>), yellow rabbitbrush (<i>Chrysothamnus viscidiflorus</i>), rubber rabbitbrush (<i>Ericameria nauseosa</i>), and others.	1,393.7
Intermountain Basins Greasewood Flat	Occurs near drainages on stream terraces and flats and around sparsely vegetated playas. Soils are saline, with a shallow water table, and flood intermittently. Open to moderately dense shrublands dominated or co-dominated by black greasewood (<i>Sarcobatus vermiculatus</i>), fourwing saltbush (<i>Atriplex canescens</i>), or shadscale (<i>Atriplex confertifolia</i>).	986.7
Intermountain Basins Big Sagebrush Shrubland	Occurs in broad basins between mountain ranges, plains, and foothills. Soils are typically deep, well drained, and nonsaline. These shrublands are dominated by big sagebrush.	978.7
Invasive Annual and Biennial Forbland	Areas that are dominated by introduced annual and/or biennial forb species, such as saltlover (<i>Halogeton glomeratus</i>), kochia (<i>Kochia scoparia</i>), Russian thistle (<i>Salsola</i> spp.), and others.	481.8
Great Basin Xeric Mixed Sagebrush Shrubland	Occurs on dry sites with typically shallow, rocky, nonsaline soils. Shrublands are dominated by black sagebrush (<i>Artemisia nova</i>), low sagebrush (<i>Artemisia arbuscula</i>), and may be co-dominated by big sagebrush or yellow rabbitbrush.	97
Intermountain Basins Semidesert Grassland	Occurs in lowland and upland xeric swales, playas, alluvial flats, and plains. Substrates are often well-drained sandy or loamy soils. The dominant perennial bunch grasses in this system are all drought resistant; they include Indian ricegrass (<i>Achnatherum hymenoides</i>), three-awn (<i>Aristida</i> spp.), blue grama (<i>Bouteloua gracilis</i>), needle-and-thread grass (<i>Hesperostipa comata</i>), and others.	74.2
Recently Mined or Quarried	Areas where mining or quarries are visible in the imagery and are 5 acres or greater in size.	49.9
Intermountain Basins Playa	Barren and sparsely vegetated playas with generally less than 10 percent plant cover. Salt crusts are common, with small saltgrass (<i>Distichlis spicata</i>) beds in depressions and sparse shrubs around the margins. These systems are intermittently flooded.	46.7
Disturbed	Areas that are barren or have relatively low vegetation cover that are associated with some form of generic human alteration or management regime.	32.1
Total	—	6,034.4

Sources: Ormat GIS 2019; USGS 2005

¹ Acres in the AOI and in the 300-foot-wide gen-tie ROW

Noxious Weeds and Nonnative, Invasive Plant Species

The Nevada noxious weed (NDA 2020) salt cedar (*Tamarix ramosissima*) was mapped in the southern portion of the AOI (BLM 2020a). Several individuals are present near existing well pads and access roads. This is the only Nevada noxious weed known from the project area; however, Russian knapweed (*Acroptilon repens*) and perennial pepperweed (*Lepidium latifolium*) have been documented nearby, along State Route 447 (BLM 2010).

As described in the biological baseline report (BLM 2020a), approximately 1,894 acres of the SWReGAP land cover type Invasive Annual Grassland was mapped in the project area. Most of these are in the

southern portion of the AOI and southern portion of the gen-tie alignment, where recent wildfires have converted other land cover types to one dominated by cheatgrass (*Bromus tectorum*) and other invasive annual species. Other nonnative, invasive plants observed in the project area are saltlover (*Halogeton glomeratus*), Russian thistle (*Salsola tragus*), and tall tumblemustard (*Sisymbrium altissimum*).

Special Status Plants

Based on ground-truthed vegetation (BLM 2020a, Section 2.6) and soil map units (BLM 2020a, Section 2.3) in the project area, there are approximately 2,265 acres of potentially suitable habitat for Tonopah milkvetch (*Astragalus pseudoiodanthus*), oryctes (*Oryctes nevadensis*), and Nevada dune beardtongue (*Penstemon arenarius*); however, these species were not observed during special status plant surveys conducted for the project (BLM 2020a).

3.2.4 Wildlife

Eagles and Other Raptors

As detailed in the biological baseline report (BLM 2020a), surveys carried out in 2019 observed occupied nests of golden eagle (*Aquila chrysaetos*) and prairie falcon (*Falco mexicanus*), and active western burrowing owl (*Athene cunicularia hypugaea*) nest complexes. Occupied common raven (*Corvus corax*) nests were also observed, and other raptor species incidentally observed were red-tailed hawk (*Buteo jamaicensis*) and northern harrier (*Circus cyaneus*).

Golden eagle and raptor aerial surveys documented 135 stick nests in the survey area, which included a 4-mile buffer around the AOI, a 2-mile buffer around the northern portion of the gen-tie alignment, and a 10-mile buffer around the southern portion of the gen-tie alignment. Of these, 69 nests were classified as likely belonging to golden eagles. In 2019, golden eagles occupied four of these nests, and there was an unsuccessful nesting attempt made at one nest (Nest 2).

Two small raptor stick nests were observed within 1 mile of the geothermal unit; neither was occupied in 2019. Eighteen stick nests were observed within 1 mile of the gen-tie alignment. One was classified as a large raptor nest and two were classified as belonging to a *Buteo* spp. or common raven. The other 15 were classified as golden eagle, or likely golden eagle, nests. None of these nests were occupied in 2019.

Burrowing owl surveys documented two active burrow complexes in 2019. Young fledged at both complexes. Burrowing owls responded to broadcast calls at two additional call points, but no burrows were found at these locations. Based on the habitat delineation methodology described in the biological baseline report (BLM 2020a), there are approximately 5,509 acres of suitable burrowing owl habitat in the project area.

As detailed in the biological baseline report (BLM 2020a), eagles and other raptors with suitable habitat in the project area, but that were not observed during surveys, are bald eagle (*Haliaeetus leucocephalus*), ferruginous hawk (*Buteo regalis*), northern goshawk (*Accipiter gentilis*), short-eared owl (*Asio flammeus*), Swainson's hawk (*Buteo swainsoni*), and peregrine falcon (*Falco peregrinus*).

Migratory Birds

Based on the habitat delineation methodology described in the biological baseline report (2020a), since migratory birds may use the entire project area, regardless of vegetation community, the entire 6,034-acre project area contains potential habitat for migratory birds.

Migratory bird point-count surveys in the geothermal unit documented six species: black-throated sparrow (*Amphispiza bilineata*), sage sparrow (*Artemisospiza nevadensis*), horned lark (*Eremophila alpestris*), barn swallow (*Hirundo rustica*), Say's phoebe (*Sayornis saya*), and Brewer's sparrow (*Spizella breweri*). Bird density was low with 0.08 birds \pm 0.05 birds per acre (or between 0.03 and 0.13 birds per acre [95 percent confidence interval]).

Other species observed incidentally were common nighthawk (*Chordeiles minor*), common raven (*Corvus corax*), loggerhead shrike (*Lanius ludovicianus*), chipping sparrow (*Spizella passerina*), western meadowlark (*Sturnella neglecta*), western kingbird (*Tyrannus verticalis*), and mourning dove (*Zenaida macroura*). Brewer's sparrow and loggerhead shrike are sensitive species (BLM Instruction Memorandum No. NV-IM-2018-003).

Though the number of migratory birds observed in the project area was relatively low, numerous other species have potential to occur there based on local habitat conditions, such as sagebrush steppe and salt desert scrub, playas, and cliffs and canyons. These species are listed in the Wildlife Clearance Form, which is included as Appendix C of the biological baseline report (BLM 2020a).

Mammals

Kangaroo Mouse Habitat Delineation

Acres of non-habitat and low-, moderate-, and high-potential habitat for dark kangaroo mouse (*Microdipodops megacephalus*) and pale kangaroo mouse (*Microdipodops pallidus*) were delineated as described in detail in the biological baseline report; they are summarized in **Table 3-4**. The habitat delineation was done in a larger area than the 6,034-acre project area; the habitat delineation area included the AOI, gen-tie alignment, and a 0.25-mile buffer around these areas, which is approximately 25,736 acres.

Table 3-4
Kangaroo Mouse Habitat

Common Name Scientific Name	Non-Habitat	Low-Potential Habitat	Medium-Potential Habitat	High-Potential Habitat	Total
Dark kangaroo mouse <i>Microdipodops megacephalus</i>	730 acres	3,444 acres	962 acres	8,403 acres	13,539 acres
Pale (<i>M. pallidus</i>) and dark kangaroo mouse	1,298 acres	4,406 acres	435 acres	6,059 acres	18,198 acres

Source: BLM 2020a

Small Mammal Trapping

Two dark kangaroo mice (genetic identification is pending) were trapped during early summer surveys for kangaroo mice. One individual was trapped in the northern portion of the AOI, and one individual was trapped along the gen-tie alignment. Additional species trapped include Merriam's kangaroo rat (*Dipodomys merriami*), Ord's kangaroo rat (*Dipodomys ordii*), northern grasshopper mouse (*Onychomys leucogaster*), Great Basin pocket mouse (*Perognathus parvus*), and deer mouse (*Peromyscus maniculatus*).

Bats

Bat surveys (such as acoustic or roost emergence surveys) were not carried out given the typically low habitat suitability observed in the project area. Several bat species may forage in vegetation communities in the project area, but foraging and roosting opportunities are limited. This is because the project area lacks surface water features. Similarly, typical roosting habitat, including mature trees, caves, abandoned mine lands, bridges, and disused buildings are not present. Bat species with potential to forage in the project area are big brown bat (*Eptesicus fuscus*), fringed myotis (*Myotis thysanodes*), western small-footed myotis (*Myotis ciliolabrum*), and Yuma myotis (*Myotis yumanensis*) (BLM 2020a). The species listed in the paragraph below may also forage in the project area.

Limited-quality roosting opportunities, primarily in the form of small and discontinuous rock outcrops, are present in some locations along the proposed gen-tie alignment. Higher-quality suitable roosting opportunities, primarily in the form of larger and more extensive cliff and rock outcrop habitat and abandoned mine workings, are present in the ranges outside the project area. The presence of these features reduces the potential that bats would roost in less suitable habitat in the project area, including in rock outcrops along the proposed gen-tie. Nonetheless, bat species with potential to roost there are Brazilian (Mexican) free-tailed bat (*Tadarida brasiliensis*), California myotis (*Myotis californicus*), canyon bat (*Parastrellus hesperus*), little brown bat (*Myotis lucifugus*), long-eared myotis (*Myotis evotis*), pallid bat (*Antrozous pallidus*), and spotted bat (*Euderma maculatum*) (BLM 2020a).

Large Mammals

Year-round and winter range habitat, as designated by the NDOW, for both mule deer (*Odocoileus hemionus*) and pronghorn antelope (*Antilocapra americana*) occurs in the project area (BLM 2020a). Further, correspondence with NDOW in April 2019 indicated that a limited amount of bighorn sheep distribution may be present in the transmission line alignment. Of these species, only pronghorn antelope was observed or detected in the project area.

In January 2020, NDOW and the Pyramid Lake Paiute Tribe released bighorn sheep in the Lake Range, including at a location approximately 4 miles south of the AOI, and approximately 5 miles south of where the proposed gen-tie alignment crosses the range. In February 2020, NDOW notified the BLM WDO¹ that several individuals had since moved through the southern portion of the AOI, near the existing geothermal plant facilities, and near the proposed gen-tie alignment. NDOW did not make recommendations at that time. However, they indicated that future recommendations, such as timing restrictions during sensitive periods, may be made based on movement data, if warranted. The BLM WDO now considers occupied bighorn habitat to be present in the project area.

Insects

There are approximately 740 acres of buckwheat (*Eriogonum* spp.) and oxytheca (*Oxytheca* spp.) populations in the project area (BLM 2020a, Section 3.7). These populations provide larval development habitat for Rice's blue (*Euphilotes pallescens ricei*) and Great Basin small blue (*Philotiella speciosa septentrionalis*) butterflies. Mexican whorled milkweed (*Asclepias fascicularis*) was observed in one location in the project area. This species is a larval host plant for monarch butterfly (*Danaus plexippus plexippus*).

¹ Personal communication between Mark Freese, Nevada Department of Wildlife, and Kathy Torrence, BLM WDO, February 13, 2020, regarding bighorn sheep movements in the Lake Range since release.

Observations of host plants indicate there is suitable habitat for these sensitive insect species; however, direct observations of the insect species were not made.

Reptiles

Based on the habitat delineation methodology described in the biological baseline report, since reptiles may use the entire project area, regardless of vegetation community, the entire 6,034-acre project area contains suitable habitat (BLM 2020a, Section 3.9).

The sensitive species Great Basin collared lizard (*Crotaphytus bicinctores*), long-nosed leopard lizard (*Gambelia wislizenii*), and desert horned lizard (*Phrynosoma platyrhinos*), were incidentally observed in the project area during the course of the other surveys carried out there. Great Basin collared lizards were observed in rocky areas. None were observed in the geothermal unit area, but scattered observations were made along the length of the proposed gen-tie alignment. Long-nosed leopard lizards were observed in areas with sandy soils. Desert horned lizards were observed in the intermountain basins mixed salt desert scrub vegetation type, both in the geothermal unit area and along the proposed gen-tie alignment. The project area is within the mapped range of an additional sensitive reptile species, northern rubber boa (*Charina bottae*). While suitable sagebrush shrubland habitat is present, this species was not directly observed.

Greater Sage-Grouse

As described in the biological baseline report (BLM 2020a), habitat for greater sage-grouse (*Centrocercus urophasianus*) was delineated by both the 2015 Nevada and Northeastern California Approved RMP Amendment (BLM 2015b) and the 2019 Nevada and Northeastern California Greater Sage-Grouse RMP Amendment (BLM 2019a). The 2015 and 2019 BLM habitat data identify greater sage-grouse habitat types as priority habitat management areas (PHMAs), general habitat management areas (GHMAs), and other habitat management areas (OHMAs). This report uses both the 2015 and 2019 BLM geographic information system (GIS) habitat data to identify greater sage-grouse habitat in the project area.

According to the 2015 greater sage-grouse habitat data, there are approximately 513 acres of OHMAs in the project area on BLM-administered lands; another 172 acres are on private lands in the project area (BLM GIS 2015). There are OHMAs in three areas of the proposed transmission line in the Nightingale Mountains and Truckee Range. There are no GHMAs or PHMAs in the project area. The nearest GHMA is approximately 2.7 miles northeast of the proposed transmission line in the Selenite Range, and the nearest PHMA is over 16 miles west of the southern portion of the proposed transmission line in the Pah Rah Range (BLM GIS 2015).

There are no habitat management areas in the project area according to the 2019 greater sage-grouse habitat data. The nearest OHMA and GHMA are approximately 6 miles west of the southern portion of the proposed transmission line in the Pah Rah Range. The nearest PHMA is approximately 17 miles west of the southern portion of the proposed transmission line, also in the Pah Rah Range (BLM GIS 2019; Figure A-15 in BLM 2020a).

Available data from the NDOW (BLM 2020a) indicate there are no known radio-marked greater sage-grouse lek sites or tracking locations in the vicinity of the project area.

The BLM coordinated with the Nevada Sagebrush Ecosystem Technical Team to determine if further project area habitat quantification was warranted, or if Alternative A would indirectly affect greater sage-grouse habitat. The team determined² that no further habitat quantification was warranted and that Alternative A would not indirectly affect greater sage-grouse habitat.

Threatened and Endangered Species

As described in the biological baseline report (BLM 2020a), the BLM WDO queried the USFWS IPaC system on April 11, 2019, and again on March 31, 2020. The USFWS IPaC identified one federally listed endangered wildlife species, cui-ui (*Chasmistes cujus*), and two federally listed threatened wildlife species, Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*) and western yellow-billed cuckoo (*Coccyzus americanus*). Critical habitat for western yellow-billed cuckoo has been proposed, but none is in the region.

There are no occupied or recovery streams for Lahontan cutthroat trout in the project area. Occupied habitat for Lahontan cutthroat trout and cui-ui, and potentially occupied habitat for western yellow-billed cuckoo, in the lower Truckee River, in the vicinity of Wadsworth, Nevada, is approximately 4 miles from the southern portion of the gen-tie. Occupied habitat for Lahontan cutthroat trout and cui-ui in Pyramid Lake is approximately 12 miles south of the AOI.

3.2.5 Soil Resources

The AOI overlaps 7 soil map units, while the gen-tie ROW overlaps 35 units (BLM 2020a, Section 2.3).

The three most prevalent soil map units underlying proposed infrastructure in the AOI are 542—Mazuma-Ragtown association, 1060—Trocken-Mazuma association, and 1444—Umbertland silty clay loam, ponded. The three most prevalent soil map units, based on acres in a 300-foot corridor around the gen-tie alignment are 1330—Sutcliff-Kleinbush-Washoe association, 1331—Sutcliff-Bundorf-Kleinbush association, and 1410—Slipback-Shawave-Nodur association. **Table 3-5** summarizes selected characteristics of these map units, including Natural Resources Conservation Service ratings for soil erosion susceptibility by wind and water.

Table 3-5
Soils

Soil Map Unit	Landscape Position	Surface Texture	Drainage	Wind Erosion Rating¹	Water Erosion Rating²
542—Mazuma-Ragtown association	Lake plains	Silt loam	Well drained	5	0.55
1060—Trocken-Mazuma association	Alluvial fans	Very gravelly sandy loam	Well drained	6	0.10
1330—Sutcliff-Kleinbush-Washoe association	no data	no data	Well drained	8	0.15
1331—Sutcliff-Bundorf-Kleinbush association	Fan remnants	Very stony loam	Well drained	7	0.15

² Personal communication between Katie Andriele, Nevada Sagebrush Ecosystem Technical Team, and Peter Gower, EMPSi, February 28, 2020, regarding assessment of Proposed Action effects on greater sage-grouse habitat.

Soil Map Unit	Landscape Position	Surface Texture	Drainage	Wind Erosion Rating ¹	Water Erosion Rating ²
1410—Slipback-Shawave-Nodur association	Fan remnants	Sandy loam	Well drained	3	0.32
1444—Umbertland silty clay loam, ponded	Lake plains	Silty clay loam	Somewhat poorly drained	8	0.37

Sources: Web Soil Survey 2019; Ormat GIS 2019

¹ Wind erosion potential is classified on a scale between 1 and 8, with a rating of 1 for soils that are highly susceptible to wind erosion, and a rating of 8 for soils that are the least susceptible to wind erosion.

² K-Factor (Whole Soil) is a water erosion rating that indicates susceptibility of a soil to sheet and rill erosion by water. K values range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to erosion by water.

3.2.6 Cultural Resources

The BLM has determined a direct area of potential effect³ (APE) for physical effects on cultural resources, and an indirect APE for visual and auditory effects. The direct APE is an approximately 6,061-acre area encompassing the AOI and gen-tie alignment, while the indirect APE is approximately 87,500 acres surrounding the direct APE. Approximately 1,709 acres of the direct APE have been previously surveyed for cultural resources within the last 20 years. A Class III cultural resources inventory of the remaining portion of the direct APE was done in July 2019 (BLM 2019b). A summary of resources is included below.

Taking all known cultural resources into account, 269 archaeological resources and 3 architectural resources are documented across the direct and indirect APEs. From this total, 177 cultural resources are not eligible for listing on the NRHP under any criteria and do not require further consideration. An additional 7 linear cultural resources cross the direct and indirect APEs, but all documented segments with the APEs are not eligible/do not contribute to the larger unevaluated linear resource. One architectural resource is in the direct APE and two architectural resources are in the indirect APE; however, none are eligible for listing on the NRHP and do not require further consideration. The remaining 85 archaeological resources are discussed below.

Cultural resources within the direct APE include eight cultural resources that are NRHP-eligible for their information potential, and another two cultural resources that are unevaluated to the NRHP.

Cultural resources within the indirect APE include one traditional cultural property that is NRHP-eligible for its association with significant events (unevaluated under other criteria) and one unrecorded potentially historic mining cabin. Visual assessments were conducted to determine potential impacts on both of these resources; the assessments indicated minimal impact. Additional eligible and unevaluated cultural resources within the indirect APE include 42 NRHP-unevaluated prehistoric artifact scatters that in all likelihood would only be eligible for listing on the NRHP for their information potential; 20 cultural resources that are NRHP-eligible solely for their information potential; and one NRHP-

³ The area of potential effect is defined as the “geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist” (36 CFR 800.16(d)).

unevaluated cultural resource adjacent to existing infrastructure such that if the resource has the potential to be indirectly affected, it would have already occurred.

Several cultural resources cover portions of both the direct and indirect APEs, including five cultural resources eligible for listing on the NRHP for their information potential and two NRHP-unevaluated cultural resources. An additional two cultural resources—segments of the California Trail and the Central Pacific Railroad—are eligible for listing on the NRHP for their association with significant events and for their information potential, and both cross through the direct and indirect APEs. Visual assessments were conducted to determine potential impacts on both of these resources; the assessments indicated minimal impact. Finally, the Lake Range District—a collection of resources related to prehistoric quarrying and processing of opalitic chert⁴—is eligible for its information potential and is spread across both the direct and indirect APEs, though approximately 12 acres of disturbance is proposed within the roughly 2,000-acre district.

3.2.7 Wild Horses and Burros

The entire AOI and an approximately 4-mile portion of the gen-tie alignment are in the Fox and Lake Range Herd Area (HA)/Herd Management Area (HMA), while an approximately 16-mile portion of the gen-tie alignment crosses the Shawave HMA and Nightingale Mountains HA, and an approximately 28-mile portion of the gen-tie alignment crosses the Truckee Range HA (**Figure A-5**, Wild Horses and Burros). HA and HMA characteristics, such as horse and burro population estimates and the appropriate management level, are described in the Winnemucca District Proposed RMP/Final EIS (BLM 2015a, pages 3-80 to 3-83).

3.2.8 Range

The BLM manages rangelands on public lands under 43 CFR 4100 and BLM Handbooks 4100 to 4180. The project area is in portions of the Blue Wing/Seven Troughs, Desert Queen, and Rodeo Creek grazing allotments. The AOI is wholly within the Rodeo Creek allotment. Collectively, these areas comprise 1,508,214 acres and 29,011 active Animal Unit Months (AUMs). The Blue Wing/Seven Troughs allotment is the largest allotment in the BLM Winnemucca District and has the most active AUMs.

The livestock type in the Blue Wing/Seven Troughs allotment is sheep and cattle; the livestock type in the other allotments is cattle. Cattle grazing is allowed year-round in the Blue Wing/Seven Troughs and Rodeo Creek allotments, but seasonally restricted to November 30–April 15 in the Desert Queen allotment (BLM 2015).

Active grazing occurs in the project area, including in the AOI and along the proposed gen-tie. Range improvements consist of watering areas for livestock, such as those located near the AOI access road from State Route 447 (**Figure A-6**, Range Improvements). There is limited fencing; livestock grazing largely takes place on the open range.

3.2.9 Recreation

Recreational activities in the project area mostly occur along the proposed gen-tie alignment, and typically include motorized and nonmotorized activities, such as hunting, nature viewing, dispersed

⁴ A yellowish-brown mineral used for stone tools.

camping, hiking, and OHV use. Many game species provide opportunities for both wildlife observation and hunting along and near the proposed gen-tie. There are also opportunities to view wild horses and burros. Recreational activities occur within the Nightingale Special Recreation Management Area (SRMA), which manages for experiences from activities where isolation is present and requires high interaction with the natural world (BLM 2015a).

Approximately 21 miles of the gen-tie are in the Nightingale SRMA and Nightingale Recreation Management Zone 5 (**Figure A-7**, Nightingale Special Recreation Management Area). The BLM manages this area for remote motorized and nonmotorized access for recreational opportunities and experiences in a backcountry and near-primitive setting (BLM 2015a).

There is little recreational activity in the AOI, most likely because of access restrictions and the presence of industrial facilities. Motorized off-highway vehicle use occurs on the access road for the existing 500 kV power line and on roads that intersect the access road. Motorized use in the AOI is for access to the existing geothermal power plant and wells. Paved and unpaved roads north and west of the AOI provide access to Empire Farms. There is limited recreational off-highway vehicle use in and surrounding the AOI.

There are no campgrounds, trails, trailheads, or other developed recreation sites in or within the immediate vicinity of the project area. The nearest developed recreation sites are at Pyramid Lake and along the Truckee River near Wadsworth, which are 12 and 4 miles away from the gen-tie alignment portion of the project area, respectively.

Driving for pleasure is also a notable recreational activity on State Route 447 along with being a primary access route into the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area (NCA). Additionally, the Burning Man Event, which occurs annually in late-August to September in the Black Rock Desert-High Rock Canyon Emigrant Trails NCA, brings large traffic volumes to State Route 447 and surrounding roadways.

3.2.10 Special Designations and Visual Resources

Special Designations

There are two wilderness study areas (WSAs) near the project area (**Figure A-8**, Wilderness Study Areas). The Mount Limbo WSA (NV020-201) is in the Selenite Range, east of State Route 447. The southern border of this WSA is within 1,000 feet of the gen-tie centerline in places. The Fox Range (NV020-014) WSA is west of the AOI in the Fox Range. The southeast corner of this WSA is approximately 1.5 miles from the AOI boundary.

Visual Resources

BLM-administered lands in the AOI and northern portion of the gen-tie alignment are visual resource management (VRM) Class III⁵, and VRM Class IV⁶ in the southern portion of the gen-tie alignment. The

⁵ The objective of VRM Class III is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

visual contrast rating system provides a systematic way to evaluate proposed projects and determine whether projects conform with the approved VRM objectives along with identifying mitigation measures to minimize impacts. A visual contrast inventory was done in the project area using key observation points (KOPs) in accordance with the BLM's VRM system (BLM Manual 8400, Manual H-8410-1, and Manual H-8431).⁷ **Appendix E** provides completed visual contrast rating worksheets, a map depicting KOP locations, and photograph logs.

3.2.11 Socioeconomics and Environmental Justice

Environmental Justice

The environmental justice analysis area is defined as Washoe and Lyon Counties, and the PLPT Reservation.

Low-Income Populations

The CEQ guidance on environmental justice (CEQ 1997) defines low-income populations based on the US Census Bureau's annual statistical poverty thresholds. The 2016 poverty level is based on total income of \$12,486 for an individual and \$24,339 for a family of four (US Census Bureau 2019a). The CEQ guidance does not specify percentage guidelines for defining a population as low income; for this analysis, low income is defined as an area where the number of individuals living below the poverty line exceeds 50 percent of the total population, or if the percentage of the low-income population is meaningfully greater (10 percentage points) than the percentage below poverty in the comparison population.

Neither county has been identified for potential environmental justice consideration; however, the PLPT meets the criteria for families living in poverty, as shown in **Table 3-6**. This is due to higher levels of low-income families than in Nevada, which is used as the reference population.

Table 3-6
Low-Income Populations

Area	Percentage of Individuals in Poverty, 2017	Percentage of Families in Poverty, 2017	Median Household Income
Washoe County	13.3	8.5	\$58,595
Lyon County	13.7	8.6	\$50,920
Pyramid Lake Paiute Tribe Reservation	22.1	20.4	\$31,800
State of Nevada	14.2	10.3	\$55,434

Source: US Census Bureau 2019b

Minority Populations

CEQ guidance defines a minority population as one where an individual group or the aggregate population of all minority groups combined exceeds 50 percent of the total population, or if the

⁶ The objective of VRM Class IV is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

⁷ Internet website: <https://www.blm.gov/programs/recreation/recreation-programs/visual-resource-management>.

percentage of the population comprising all minority groups is meaningfully greater (10 percentage points) than the minority population percentage in the broader region.

Nevada has a higher aggregate minority population than all analysis area counties, at 49.5 percent, as shown in **Table 3-7**. As a result, no racial or ethnic minority populations have been identified for further environmental justice consideration.

Table 3-7
Minority Population Demographics

Population	Washoe County (Percent)	Lyon County (Percent)	State of Nevada (Percent)
Total population	445,551	52,303	2,887,725
Hispanic or Latino	106,543 (23.9)	8,486 (16.2)	814,305 (28.2)
White	354,735 (79.6)	44,910 (85.9)	1,936,543 (67.1)
Black or African American	10,103 (2.3)	545 (1)	253,013 (8.8)
American Indian or Alaska Native	7,219 (1.6)	1,248 (2.4)	32,426 (1.1)
Asian	23,906 (5.4)	571 (1.1)	232,502 (8.1)
Native Hawaiian and Other Pacific Islander	2,689 (0.6)	109 (0.2)	19,019 (0.7)
Other race	27,714 (6.2)	2,777 (5.3)	279,977 (9.7)
Two or more races	19,185 (4.3)	2,143 (4.1)	134,335 (4.7)
Aggregate minority population	161,563 (36.3)	12,513 (23.9)	1,430,453 (49.5)

Source: US Census Bureau 2019c

Native American Populations

The BLM identified the PLPT as having religious or cultural affiliation within the analysis area. Government-to-government consultation with the PLPT is ongoing, as described in **Section 4.1**, Tribes, Individuals, Organizations, and Agencies Consulted.

Socioeconomics

The socioeconomic analysis area is the project area, which includes portions of Washoe, Pershing, Churchill, and Lyon Counties. Data on employment and income were collected from Washoe and Lyon Counties to best represent the analysis area.

The population centers closest to the project area are Gerlach in Washoe County and Fernley in Lyon County. In 2017, Washoe County had a population of 445,551, while Lyon County had a population of 52,303 (US Census Bureau 2019c). Other nearby populations are the Pyramid Lake Indian Reservation, with a population of 1,473 (US Census Bureau 2019c).

In 2017, Washoe County had rental vacancy rates of 5.6 percent and median rental rates of \$947, while Lyon County had rental vacancy rates of 4.8 percent and median rental rates of \$919 (US Census Bureau 2019a).

In 2017, unemployment varied from 4.2 percent in Washoe County to 6.0 percent in Lyon County. For reference, Nevada had an annual unemployment rate of 5.1 percent in 2018 (BLS 2019).

3.2.12 Land Use and Infrastructure

Existing land use authorizations in and surrounding the AOI are the San Emidio geothermal power plant and associated wells and well pads, geothermal pipelines, access roads, electrical substation, and ancillary structures associated with geothermal operations. Empire Farms, a working alfalfa farm with several agricultural fields and residential structures, is approximately 2 miles west of the northern portion of the AOI. Rodeo Creek Road, a Washoe County-maintained public roadway, provides shared access from State Route 447 to Empire Farms, the Wind Mountain Mine, and the AOI. Most segments of Rodeo Creek Road are paved, while others are unpaved gravel.

The gen-tie portion of the project area is within a designated west-wide energy corridor. It crosses or is next to authorized ROWs, including for a 500 kV transmission line, smaller distribution power lines, and State Route 447.

3.2.13 Noise

During operation, geothermal power plants and well pumps generate noise that is audible above ambient sound at certain distances. Ambient sound is the result of combined noise sources in a given area, usually measured in A-weighted decibels (dBA), which most closely relates to the way humans perceive sound. The decibel scale is logarithmic, not linear. In other words, two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound, and twice as loud as a 60-dBA sound. Noise from stationary sources lessens at a rate of approximately 6 dB per doubling of distance, depending on such environmental conditions as topography, vegetation, and weather. **Table 3-8** indicates typical noise levels for common indoor and outdoor situations.

Table 3-8
Typical Noise Levels

Common Outdoor Activity	Noise Level (dBA)	Common Indoor Situation
Typical construction site at 50 feet	70–105	—
Jet fly-over at 1,000 feet	100	—
Gas lawn mower at 3 feet	90	—
Geothermal steam turbine and electric generator and cooling fans at 8 feet	80–85	Food blender at 3 feet; garbage disposal at 3 feet
Operational 1,250-horsepower geothermal production well at 2 feet;		
Diesel truck at 50 feet traveling 50 miles per hour		
Congested urban area, daytime	70	Vacuum cleaner at 10 feet
Commercial area with heavy traffic	60	Normal speech at 3 feet
Quiet urban daytime	50	Large business office; dishwasher in next room
Quiet urban nighttime	40	Theater, large conference room (background)
Quiet suburban nighttime	30	Library
Quiet rural nighttime	20	Bedroom at night
—	10	Broadcast/recording studio
Lowest threshold of human hearing	0	Lowest threshold of human hearing

Source: Caltrans 2013, US EPA 1971

The typical operational noise levels for binary geothermal power plants and production wells are between 70 and 85 dBA. At approximately 1,000 feet from these features, with no obstructions, typical noise levels are 50 dBA or less, and 40 dBA or less at 1 mile. Observed noise levels at 625 feet from Ormat's Tungsten Mountain binary geothermal power plant are 60 dBA (Ormat 2018). Topography, weather, vegetation, and other environmental conditions would increase the rate of reduction (Ormat 2018, 2019b). Noise from the existing San Emidio power plant, wells, and plant operations result in higher ambient noise levels in the AOI compared with surrounding areas where there is no industrial development. Similarly, corona discharge⁸ from the existing 500 kV powerline contributes to ambient noise levels within approximately 100 feet of the line.

3.3 ENVIRONMENTAL CONSEQUENCES

3.3.1 Analysis Method and Assumptions

This section describes the potential impacts on resources and resource uses by issue. It assesses impacts from the alternatives in terms of their duration (temporary or permanent) and context (local or regional). A temporary impact is one that occurs only during implementation of the alternative, while a permanent impact could occur for an extended period after implementation of the alternative. Where appropriate, the analysis provides recommended avoidance, minimization, or mitigation measures to avoid, reduce, or otherwise offset impacts on the specified resource. These measures are described below. Any specific assumptions are identified for each issue.

Implementing applicant-committed environmental protection measures (**Section 2.1.3**), additional stipulations required by the BLM WDO (see **Table 3-9**), and best management practices in Appendix D of the Geothermal PEIS (BLM and Forest Service 2008) would avoid, reduce, or mitigate effects. Analysis of the environmental consequences of implementing applicant-committed environmental protection measures and BLM-recommended mitigation and monitoring measures follows the analysis of direct and indirect effects under each issue. The direct and indirect effects are those that may occur after implementing the applicant committed, BLM-recommended mitigation and monitoring measures, and best management practices from the Geothermal PEIS, as applicable.

⁸ A buzzing or humming sound from powerlines that is the result of electrical discharge into the air surrounding the line.

Table 3-9
BLM-Required Stipulations

Resource	Required Stipulation	Applicable Issue(s)
Cultural	<ul style="list-style-type: none"> Proposed work areas would be located away from potentially sensitive sites and would be approved by the BLM Authorized Officer prior to work beginning in these areas. All cultural resources that are eligible or unevaluated for listing on the NRHP would be avoided. When ground-disturbing project activities would occur within 30 meters (98 feet) of an NRHP-eligible or unevaluated cultural resource, an archaeological monitor would be present to ensure that resources are not disturbed. Temporary or permanent fencing around NRHP-eligible or unevaluated cultural resources may be installed to prevent disturbance if determined necessary by the BLM. Employees, contractors, and suppliers would be instructed that all cultural resources are protected, and that if previously undiscovered resources are encountered, they will be left in place and reported to the BLM by the responsible Ormat representative. 	3
Range	<ul style="list-style-type: none"> To minimize the potential that livestock would ingest geothermal fluids, Ormat would coordinate with the BLM WDO to obtain approval prior to discharging geothermal fluids to the ground surface during short- and long-term well testing activities. 	2
Special Designations and Visual Resources	<ul style="list-style-type: none"> The paint used on the power plant, pipelines, wellheads, pump motors, and motor control buildings would be consistent with BLM visual guidelines to blend with the area and minimize their visibility. The overhead conductors used on the gen-tie power poles would have a matte surface to reduce sunlight reflection and glare. 	4
Vegetation	<p><u>General</u></p> <ul style="list-style-type: none"> If a special status plant species is identified during construction, work near the plant(s) would be halted, and a qualified biologist familiar with the biology and species likely to be encountered in the project area would be consulted to determine an appropriate buffer and other protective measures. The appropriate resource agencies would be notified of the discovery within 24 hours. If avoidance is infeasible, consultation with the jurisdictional resource agency would be conducted prior to continuing work in the immediate area of the species. Any federal- or state-listed species discovered on public land would also be reported to the BLM, USFWS, and NDOW. The operator would identify important, sensitive, or unique habitat and biota in the project vicinity and site and should design the project to avoid (if possible), minimize, or mitigate potential impacts on these resources. The design and siting of the facilities would follow appropriate guidance and requirements from the BLM. 	<p>3</p> <p>4</p>

Resource	Required Stipulation	Applicable Issue(s)
Vegetation (cont.)	<p><u>Portion of Area of Interest not previously surveyed</u></p> <ul style="list-style-type: none"> The BLM analyzes specific environmental protection measures as part of the proposed project NEPA documentation process. To ensure that potential impacts on species of concern from the proposed project are avoided, minimized, or mitigated, as applicable, a potential environmental protection measure would be a requirement that pre-construction surveys be conducted in the additional area before the surface is disturbed. If pre-construction surveys indicate suitable habitat or presence of the same species of concern as documented elsewhere in the biological baseline report and EA, then the same recommended measures to avoid, minimize, or mitigate impacts would be applied. If pre-construction surveys indicate suitable habitat or presence of a species of concern not already documented elsewhere in the biological baseline report and EA, then additional NEPA documentation would occur. Measures to avoid, minimize, or mitigate impacts would be developed during that additional NEPA process. Unoccupied disturbed areas would be seeded by the applicant as directed by the BLM WDO using a BLM-approved native seed mixture and application rate. Any variance in the mix would be coordinated first with the BLM WDO. Following construction activities, areas of disturbed land no longer required for operations would be reclaimed to promote the reestablishment of native plant and wildlife habitat. Prior to any surface-disturbing activities, a special status plant survey is required for the entire disturbance area. Timing of the survey would be dependent on the habitat type and the detectability of the target species. If a special status plant is located, a protective buffer would be delineated in consultation with the BLM Authorized Officer. 	<p>3</p> <p>3</p> <p>3 and 4</p> <p>3 and 4</p> <p>3</p>
Wildlife	<p><u>General</u></p> <ul style="list-style-type: none"> To minimize the potential that wildlife would ingest geothermal fluids, Ormat would coordinate with the BLM WDO to obtain approval prior to discharging geothermal fluids to the ground surface during short- and long-term well testing activities. Discharges may be limited seasonally during sensitive time periods for wildlife species. If a sensitive animal species is identified during construction, work near the sensitive species would be halted, and a qualified biologist familiar with the biology and species likely to be encountered in the project area would be consulted to determine an appropriate buffer and other protective measures. The appropriate resource agencies would be notified of the discovery within 24 hours. If avoidance is not feasible, consultation with the jurisdictional resource agency would be conducted prior to continuing work in the immediate area of the species. Any federal- or state-listed species discovered on public land would also be reported to the BLM, USFWS, and NDOW. The Ormat would prepare a habitat restoration plan to avoid (if possible), minimize, or mitigate negative impacts on vulnerable wildlife while maintaining or enhancing habitat values for other species. The plan would identify revegetation, soil stabilization, and erosion reduction measures that would be implemented to ensure that all temporary use areas are restored. The plan would require that restoration occur as soon as possible after completion of activities to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats. Ormat would implement applicable measures described in NDOW's <i>Design Features and Tools to Reduce Wildlife Mortalities Associated with Geothermal Sumps</i>. Applicable measures would be determined in coordination with the BLM WDO and NDOW. 	<p>3</p> <p>3</p> <p>3</p> <p>4</p>

Resource	Required Stipulation	Applicable Issue(s)
Wildlife (cont.)	<ul style="list-style-type: none"> Ormat would ensure that employees, contractors, and site visitors avoid harassment and disturbance of wildlife, especially during reproductive (e.g., courtship and nesting) seasons. In addition, pets would be controlled or excluded to avoid harassment and disturbance of wildlife. 	4
	<ul style="list-style-type: none"> Ponds, tanks, and impoundments (including but not limited to drill pits) containing liquids can present hazards to wildlife. Any liquids contaminated by substances that may be harmful due to toxicity, or fouling of the fur or feathers (detergents, oils), should be excluded from wildlife access by fencing, netting, or covering at all times when not in active use. Liquids at excessive temperatures should likewise be excluded. If exclusion is not feasible, such as a large pond, a hazing program based on radar or visual detection, in conjunction with formal monitoring, should be implemented. Clean water impoundments can also present a trapping hazard if they are steep-sided or lined with smooth material. All pits, ponds, and tanks should have escape ramps functional at any reasonably anticipated water level, down to almost empty. Escape ramps can take various forms depending on the configuration of the impoundment. Earthen pits may be constructed with one side sloped 3:1 or greater; lined ponds can use textured material; straight-sided tanks can be fitted with expanded metal escape ladders (Geothermal PEIS; BLM and Forest Service 2008). 	4
	<u>General – Portion of Area of Interest not previously surveyed</u>	
	<ul style="list-style-type: none"> The BLM analyzes specific environmental protection measures as part of the proposed project NEPA documentation process. To ensure that potential impacts on species of concern from the proposed project are avoided, minimized, or mitigated, as applicable, a potential environmental protection measure would be a requirement that pre-construction surveys be conducted in the additional area before the surface is disturbed. If pre-construction surveys indicate suitable habitat or presence of the same species of concern as documented elsewhere in the biological baseline report and EA, then the same recommended measures to avoid, minimize, or mitigate impacts would be applied. 	3
	<ul style="list-style-type: none"> If pre-construction surveys indicate suitable habitat or presence of a species of concern not already documented elsewhere in the biological baseline report and EA, then additional NEPA documentation would occur. Measures to avoid, minimize, or mitigate impacts would be developed during that additional NEPA process. 	3
	<u>Bighorn Sheep</u>	
	<ul style="list-style-type: none"> If recommended by NDOW, construction activity in newly-occupied bighorn sheep habitat in the Lake Range and Nightingale Range may be limited during critical life history stages. Measures would be determined in coordination with the BLM WDO and NDOW. 	3
	<u>Greater Sage-Grouse</u>	
	<ul style="list-style-type: none"> Project would be in compliance with Nevada State Executive Order 2018-32, which may include coordination with the Sagebrush Ecosystem Technical Team on the application of a compensatory mitigation program, such as the Nevada Conservation Credit System for mitigating activities that result in habitat loss and degradation of greater sage-grouse habitat in Nevada, where the application of compensatory mitigation would occur on or the credit would be applied to disturbance on BLM-administered lands. 	1, 3 and 4

Resource	Required Stipulation	Applicable Issue(s)
Wildlife (cont.)	<ul style="list-style-type: none"> • Greater sage-grouse required design features (RDFs; BLM 2015b, Appendix C) would be implemented along the 7 miles of proposed gen-tie that crosses areas mapped as OHMA on BLM-administered lands (BLM GIS 2015; see Issue 3 Mitigation). Within OHMAs, the following RDFs would be applied: <ul style="list-style-type: none"> ○ RDF Gen 1 – Locate new roads outside of greater sage-grouse habitat to the extent practical. ○ RDF Gen 2 – Avoid constructing roads within riparian areas and ephemeral drainages. Construct low water crossings at right angles to ephemeral drainages and stream crossings (note that such construction may require permitting under Sections 401 and 404 of the Clean Water Act). ○ RDF Gen 3 – Limit construction of new roads where roads are already in existence and could be used or upgraded to meet the needs of the project or operation. Design roads to an appropriate standard, no higher than necessary, to accommodate intended purpose and level of use. ○ RDF Gen 4 – Coordinate road construction and use with ROW holders to minimize disturbance to the extent possible. ○ RDF Gen 5 – During project construction and operation, establish and post speed limits in greater sage-grouse habitat to reduce vehicle/wildlife collisions or design roads to be driven at slower speeds. ○ RDF Gen 7 – Require dust abatement practices when authorizing use on roads. ○ RDF Gen 9 – Upon project completion, reclaim roads developed for project access on public lands unless, based on site-specific analysis, the route provides specific benefits for public access and does not contribute to resource conflicts. ○ RDF Gen 11 – Equip temporary and permanent aboveground facilities with structures or devices that discourage nesting and perching of raptors, corvids, and other predators. ○ RDF Gen 12 – Control the spread and effects of nonnative, invasive plant species (e.g., by washing vehicles and equipment, minimize unnecessary surface disturbance; Evangelista et al. 2011). All projects would be required to have a noxious weed management plan in place prior to construction and operations. ○ RDF Gen 13 – Implement project site-cleaning practices to preclude the accumulation of debris, solid waste, putrescible wastes, and other potential anthropogenic subsidies for predators of greater sage-grouse. ○ RDF Gen 15 – When interim reclamation is required, irrigate site to establish seedlings more quickly if the site requires it. ○ RDF Gen 16 – Utilize mulching techniques to expedite reclamation and to protect soils if the site requires it. ○ RDF Gen 17 – Restore disturbed areas at final reclamation to the pre-disturbance landforms and desired plant community. ○ RDF Gen 18 – When authorizing ground-disturbing activities, require the use of vegetation and soil reclamation standards suitable for the site type prior to construction. ○ RDF Gen 19 – Instruct all construction employees to avoid harassment and disturbance of wildlife, especially during the greater sage-grouse breeding (e.g., courtship and nesting) season. In addition, pets shall not be permitted on site during construction (BLM 2005). ○ RDF Gen 20 – To reduce predator perching in greater sage-grouse habitat, limit the construction of vertical facilities and fences to the minimum number and amount needed and install anti-perch devices where applicable. 	1, 3 and 4

Resource	Required Stipulation	Applicable Issue(s)
Wildlife (cont.)	<ul style="list-style-type: none"> ○ RDF Gen 22 – Load and unload all equipment on existing roads to minimize disturbance to vegetation and soil. ○ RDF LR-LUA 1 – Where new ROWs associated with valid existing rights are required, collocate new ROWs within existing ROWs or where it best minimizes impacts in greater sage-grouse habitat. Use existing roads or realignments of existing roads to access valid existing rights that are not yet developed. ○ RDF LR-LUA 3 – Where necessary, fit transmission towers with anti-perch devices (Lammers and Collopy 2007) in greater sage-grouse habitat. ○ RDF Lease FM 1 – Collocate power lines, flow lines, and small pipelines under or immediately adjacent to existing roads (Bui et al. 2010) in order to minimize or avoid disturbance. ○ RDF Lease FM 4 – Ensure habitat restoration meets greater sage-grouse habitat objectives for reclamation and restoration practices/sites (Pyke 2011). ○ RDF Lease FM 5 – Maximize the area of interim reclamation on long-term access roads and well pads, including reshaping, topsoil management, and revegetating cut-and-fill slopes. ○ RDF Lease FM 6 – Restore disturbed areas at final reclamation to the pre-disturbance landforms and ensure it meets the greater sage-grouse habitat objectives. ○ RDF Lease FM 11 – Cluster disturbances associated with operations and facilities as closely as possible, unless site-specific conditions indicate that disturbances to greater sage-grouse habitat would be reduced if operations and facilities locations would best fit a unique special arrangement. ○ RDF Lease-FM 12 – Apply a phased approach with concurrent reclamation. ○ RDF Lease-FM 15 – Consider using oak (or other material) mats for drilling activities to reduce vegetation disturbance and for roads between closely spaced wells to reduce soil compaction and maintain soil structure to increase likelihood of vegetation reestablishment following drilling. 	
<hr/>		
	<p>Dark Kangaroo Mouse (DKM) and Pale Kangaroo Mouse (PKM)</p> <p>The following options outline potential actions considered by the BLM and NDOW to minimize impacts on DKM/PKM habitat caused by the development of the proposed project:</p> <ul style="list-style-type: none"> • Avoidance of dark and pale kangaroo mice and identified habitat <ul style="list-style-type: none"> ○ When possible, project features should be located outside of DKM/PKM habitat. However, based on the location of the geothermal resource and siting needs for the project, complete avoidance of suitable dark and pale kangaroo mouse habitat is not possible. Thus this mitigation cannot be fully employed. • Minimize impacts on dark and pale kangaroo mice and identified habitat <ul style="list-style-type: none"> ○ If the project/activity cannot be placed outside DKM/PKM habitat, locate the surface-disturbing activities in non-habitat areas first, then in the least suitable habitat for DKM/PKM. For example, staging areas should avoid the most suitable habitat and should be created in non-habitat first. ○ Collocate the project/activity next to or in the footprint of existing infrastructure to minimize the amount of habitat disturbance. ○ Whenever possible, minimize the amount of habitat disturbance in high and medium potential habitat. For example, power pole placement should be designed to span high and medium potential habitat whenever possible. 	3

Resource	Required Stipulation	Applicable Issue(s)
Wildlife (cont.)	<ul style="list-style-type: none"> ○ However, based on the location of the geothermal resource and siting needs for the project, it is unknown at this time if this mitigation is feasible and it is unknown if this mitigation would be effective to minimize impacts on DKM/PKM habitat. • Restore suitable replacement habitat within project area <ul style="list-style-type: none"> ○ Selection of the proposed project would result in the temporary removal of approximately 857 acres of mouse habitat and the permanent removal of 176 acres of mouse habitat. ○ Following construction activities, the 857 acres of temporarily disturbed mouse habitat no longer required for operations would be restored to promote the reestablishment of native plant and DKM/PKM habitat. As DKM/PKM are burrowing/fossorial species, they are dependent on specific soil conditions (Ghiselin 1970, Hafner and Upton 2011). It is unknown if the temporary disturbance from project actions would cause changes in the soil to not be inhabitable by DKM/PKM (e.g., soil compaction). In the event portions or all of the 857 acres of temporarily disturbed mouse habitat soil characteristics have been altered and are no longer inhabitable for DKM/PKM, the portions of uninhabitable habitat would be replaced by restoring mouse habitat within the project area at a 1 to 1 ratio. ○ The 176 acres of mouse habitat permanently removed by project activities would be replaced by restoring mouse habitat within the project area at a 2 to 1 ratio. Therefore, a total of 352 acres of habitat would need to be restored within the project area to replace the permanently lost mouse habitat. The 2 to 1 ratio is following the same approach identified in the Crescent Dunes Solar Energy Project, which required a 2 to 1 ratio for permanent PKM habitat loss. ○ Prior to implementation, suitable on-site areas would need to be identified, preferably in areas where medium quality habitat is adjacent to high quality habitat. Soil information for construction areas would also need to be monitored before and after construction activities to determine if the soil characteristics are uninhabitable. Habitat restoration would include revegetating habitat using a BLM WDO-approved seed mixture and focusing on key soil characteristics. In the event that heavy seeding equipment could crush DKM/PKM and their habitat, restoration activities would need to include hand seeding and/or hand planting seedlings. ○ It is recommended that rehabilitated areas be fenced to eliminate grazing by livestock, which would require coordination with the permittee and further NEPA analysis. The success and effectiveness of this option is unknown due to the uncertainty of future multiple-use actions within the project area. 	
	Dark and Pale Kangaroo Mouse Habitat Research	
	<ul style="list-style-type: none"> • Currently, information regarding the DKM/PKM local and geographic distribution, habitat use, population demography (e.g., abundance estimates, mortality), population genetics (e.g., cryptic speciation and distinct lineages), and dietary needs is limited. Through pre-construction trapping efforts, a rough distribution of kangaroo mice occupancy is known throughout the proposed disturbance sites. • For this loss of known habitat, Ormat would develop and implement a BLM-approved monitoring plan to enable informed management and land use decisions for the long-term management and conservation of the DKM/PKM. 	

Resource	Required Stipulation	Applicable Issue(s)
Wildlife (cont.)	<ul style="list-style-type: none"> At a minimum, Ormat's plan would contain the following parameters: 1) compile and summarize existing PKM and DKM information to develop project goals and methodologies for habitat mapping, surveying, and sampling; and 2) use the above information to conduct surveys to determine habitat needs, distribution, and relative abundance of the PKM/DKM. Data would be collected and analyzed to develop spatially precise PKM/DKM distribution and abundance information, set guidelines for and establish long-term population monitoring, possibly clarify population genetics, and refine trapping protocols to enhance efficacy. This monitoring would run for 2 to 5 years. The synthesis of this data collection process would contribute to the BLM and NDOW's evaluation of DKM/PKM status, help understand the effectiveness of habitat restoration efforts, and address a projected risk of further protection for this vulnerable species (Light et al. 2013). To be in compliance with BLM's Compensatory Mitigation IM-2019-018, the monitoring under this mitigation would need to be conducted within the power plant and transmission line project area. 	
	<u>Migratory Birds</u>	
	<ul style="list-style-type: none"> In order to avoid potential impacts on breeding migratory birds, a nest survey would be conducted by a qualified biologist within potential breeding habitat prior to any surface disturbance proposed during the avian breeding season (March 1st through August 31st). Surveys would be conducted no more than 10 days and no less than 3 days prior to initiation of surface disturbance. Surveys would follow established BLM standards and protocols and would be approved by the BLM biologist prior to being implemented. If active nests are located, the BLM biologist would be notified immediately and appropriate protection measures, which may include avoidance or restriction of activities, would be established. If no active nests are present in the area survey, implementation of the surface disturbance would commence within 10 days of survey completion. 	3
	<u>Raptors (including golden eagles)</u>	
	<ul style="list-style-type: none"> The proposed gen-tie would provide raptor protection in compliance with the standards described in the Suggested Practices for Raptor Protection on Powerlines, The State of the Art in 2006 (APLIC 2006). 	4
	<ul style="list-style-type: none"> All power poles would be constructed to be eagle safe and/or utilize raptor anti-electrocution and devices or equipment. 	4
	<ul style="list-style-type: none"> Bald and/or golden eagles may now or hereafter be found to use the project area. The BLM would not issue a notice to proceed for any project that is likely to result in take of bald eagles and/or golden eagles until the applicant completes its obligation and demonstrates compliance with the Bald and Golden Eagle Protection Act, including coordination with the USFWS on agreed-upon measures to avoid take, or to obtain an eagle take permit should take be unavoidable. The BLM hereby notifies the applicant that compliance with the Eagle Act is a dynamic and adaptable process that may require the applicant to conduct further analysis and mitigation following assessment of operational impacts. Any additional analysis or mitigation required to comply with the Eagle Act would be developed with the USFWS and coordinated with the BLM (WO-IM-2010-056). 	4

Resource	Required Stipulation	Applicable Issue(s)
Wildlife (cont.)	<p><u>Western Burrowing Owl (BUOW)</u></p> <ul style="list-style-type: none"> During western burrowing owl nesting season (March 1 through August 31), a clearance survey following the BLM WDO's clearance survey protocol would be conducted by a qualified biologist prior to surface disturbance in the areas identified as potential BUOW habitat within the project area and survey results and report submitted to the BLM. For active burrows, an avoidance buffer, no less than 75 meters (250 feet), would be established and the buffer area avoided to prevent destruction or disturbance to nests/burrows until they are no longer active. The site characteristics used to determine the size of the buffer are: a) topographic screening; b) distance from disturbance to nest/burrow; c) the size and quality of foraging habitat surrounding the nest/burrow; d) sensitivity of the species to nest disturbances; and e) the protection status of the species. Additional monitoring would be conducted to ensure the nesting BUOW have fledged the nest prior to disturbance. If no active nests are present within the area surveyed, implementation of the proposed disturbance would commence within 10 days of survey completion. To avoid impacts on burrowing owls, there would be no construction near known burrow complexes. As above, construction near burrows would be done outside the breeding season, unless it must occur during this period; in this case, breeding season pre-construction surveys, following the BLM WDO method, would be conducted, and active burrows would be avoided by using an appropriate buffer during the breeding season. An adaptive approach to BUOW and habitat would be required for the portion of the AOI not previously surveyed for BUOW during baseline data collection. <ul style="list-style-type: none"> Phase 1: Prior to any surface-disturbing activities, a BUOW baseline survey is required for the entire portion of the AOI not previously surveyed. The BUOW survey would follow the BLM WDO's BUOW baseline survey protocol, which requires BUOW surveys for three survey windows in the same breeding season. BUOW survey point locations would need to be coordinated through BLM prior to surveys being conducted by a qualified biologist. Phase 2: Any BUOW and associated complexes identified during the Phase 1 surveys would be protected following the same measures previously identified for the entire project area. Monitoring would be required to determine if the BUOW return to the associated burrows after project construction and temporary disturbance. Phase 3: Additional protection measures may be implemented in the event multiple BUOW burrows identified in the portion of the AOI not previously surveyed would be permanently removed due to project activities and/or monitoring results indicate that BUOW have not returned to previously occupied habitat. Additional protection measures may include coordinating with the BLM and NDOW to create Artificial Burrow Systems (ABS) to replace lost burrows. Techniques and methods for creating the ABS would be done in coordination with the BLM and the NDOW based on existing literature. Pre-clearance surveys would be completed prior to the installation of ABS. Monitoring for the effectiveness of the created ABS would include identification of BUOW within the project area during the time of year they are present (spring/summer) and capturing and tagging BUOW by installing telemetry devices to track their movements to determine if they are using the ABS for nesting. Monitoring would be coordinated with the BLM and NDOW prior to any field identification of BUOW. If Phase 3 is implemented, monitoring would be required for 5 years. 	<p>I and 3</p> <p>I and 3</p> <p>I and 3</p>

Resource	Required Stipulation	Applicable Issue(s)
Water	<ul style="list-style-type: none"> The shallow groundwater aquifer would be monitored to allow early detection of potential changes. Ormat would prepare a hydrologic monitoring program outlining monitoring locations, parameters, frequency, and duration, for BLM Authorized Officer approval prior to drilling activities. If water quality effects in groundwater aquifers were detected, appropriate measures to mitigate effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. Within one year of the signing of the Decision Record, the proponent will develop in coordination with the BLM, a monitoring plan for the water sources listed in Table 5 of the Hydrogeology Baseline Report. The BLM will have final approval of the monitoring plan. 	2
Wild Horses and Burros	<ul style="list-style-type: none"> To minimize the potential that livestock and wild horses would ingest geothermal fluids, Ormat would coordinate with the BLM WDO to obtain approval prior to discharging geothermal fluids to the ground surface during short- and long-term well testing activities. Discharges may be limited seasonally during sensitive time periods for wild horses and burros. 	2

3.3.2 Issue 1: How would ambient noise levels change, and what would be the effect on sensitive resources?

Analysis Area and Assumptions

The primary noise generators would be construction, including drilling wells and building the plants and associated infrastructure, including the gen-tie. Noise generators associated with project operation would be the production well pumps and the cooling fans, generators, and steam turbines at the two power plants. The assumption is that, at a typical noise attenuation rate, the noise levels at 1,500 feet from the plants and wells would be at or below 50 dB and that at 1 mile the noise level would be at or below 40 dBA. Accordingly, the analysis area for direct effects is the project area, including the AOI and gen-tie alignment, plus a 1-mile buffer around this area.

Direct effects would occur at the project area during construction and operation and maintenance. Indirect effects could occur farther away from the project area; effect intensity would depend on the distance from the project area and on receptor sensitivity.

Effects from Alternative A: Proposed Action

Wildlife

Construction-related noise may temporarily displace wildlife from suitable habitat in and around the construction area. This may reduce breeding or nesting success, especially if species are displaced during sensitive life-cycle periods. Noise may also affect foraging opportunities. For example, raptors may avoid foraging in or near the project area during construction. Generally, these effects would last only as long as construction.

Construction would not occur within 1 mile of golden eagle nests during the golden eagle breeding season (generally late January through August), per USFWS-recommended conservation measures (**Appendix D**). Thus, construction noise would be unlikely to disrupt golden eagle nesting, reduce nest productivity, or cause nest abandonment.

Construction would not occur near active burrowing owl burrows or migratory bird nests during the burrowing owl and migratory bird breeding season (March 15 through August 30). Thus, construction would be unlikely to cause nest failure or abandonment.

Residual operational noise generated by geothermal power plants despite noise-reducing operational design may affect wildlife differently than construction-related noises. This is because power plant-generated noises are consistent and at lower decibel, as opposed to the inconsistent, sudden, higher decibel noises from typical construction activities. This type of noise may inhibit a species' ability to hear sounds and communicate with others (Barber et al. 2009). This would cause long-term habitat loss in an area greater than the actual plant footprints.

The existing San Emidio power plant, approximately 0.5 mile north of the proposed plants, already generates operational noise in the area (see **Section 3.2.13**). Operational noise under Alternative A would be the same type and level as the noise from the existing operational power plant. Noise from Alternative A, especially north of the proposed power plants, would be largely imperceptible from noise associated with the existing plant. There would be higher ambient noise levels south of the proposed plants where ambient noise levels are currently lower because of the further distance from the San Emidio facility. Additionally, Alternative A would comply with the BLM regulation that mandates noise at 0.5 mile—or at the lease boundary if closer—from a major geothermal operation should not exceed 65 dBA (43 CFR 3200.4[b]). Accordingly, Alternative A would not result in any additional effects on wildlife from operational noise beyond those already occurring or as allowed by law.

Both construction and residual operational noise could displace big game species from habitat in or near the project area. Construction-related displacement would be a temporary effect, while displacement due to residual operational noise would be a long-term effect. However, it is expected that even if animals avoid the plant location, increasingly lower operational noise further from the plant and wells that approach ambient conditions for a rural setting would not affect movement in and use of the surrounding contiguous habitat.

Bats may be affected by operational noise, because they echolocate and receive sound waves in a wide range of frequencies. Residual operational noise may disrupt bat foraging behavior by acoustic masking, attentional distraction, and avoidance response (Barber et al. 2009). This effect would be long term, but it is not expected to affect bats at high quality foraging or roosting habitat, because there is no such habitat at or near the proposed power plant locations.

Proposed Mitigation

Implementing applicant-committed environmental protection measures (see **Section 2.1.3**) would reduce the potential for effects on wildlife from noise. Specifically, noise-reducing measures, including muffles on drilling rig engines, and operational practices and design would minimize noise level generation and distinctive noise impacts.

Effects from construction noise on breeding golden eagles would be avoided by implementing measures described in the project's USFWS-approved eagle conservation plan. The plan would be approved by the USFWS before construction begins on the proposed gen-tie. The draft plan is included **Appendix D** of this EA.

Implementing BLM-required stipulations would avoid construction noise impacts on breeding migratory birds and burrowing owls because construction would be done outside the breeding season. If construction must occur during this period, pre-construction surveys, following the BLM WDO method, would be conducted (see **Table 3-9**). Active nests near the construction area would be avoided by using an appropriate buffer, as determined in coordination with the BLM WDO. For migratory birds, buffers would remain in effect until young have fledged or the nest has failed, subject to BLM WDO approval. Combined with noise-reducing plant design and operation, timing construction outside the breeding season (see **Table 3-9**) would avoid noise impacts on wildlife during the most sensitive life cycle stage.

If recommended by NDOW, limiting construction activity in newly-occupied bighorn sheep habitat in the Lake Range and Nightingale Range during critical life history stages, as determined in coordination with the BLM WDO and NDOW, would avoid noise-related impacts from construction activities (**Table 3-9**).

Wild Horses and Burros

Noise from gen-tie construction, particularly stringing lines using helicopters, could temporarily harass, disturb, or displace animals in HAs and HMAs. While construction of the gen-tie is anticipated to take up to approximately 9 months, stringing would be a relatively small portion of the overall time needed to construct the gen-tie. Should this effect occur, it would be reduced in intensity because it would happen outside of critical breeding and birthing periods. In the Nightingale Mountains HA, the proposed gen-tie is approximately 1 mile east of Sage Hen Springs, which is an important water source for animals. Given this, effects may be most likely to occur at this location.

Animals in the Fox and Lake Range HA/HMA may also avoid the area around the proposed geothermal plants due to operational noise. As described under *Wildlife*, animals may already avoid this general location due to operational noise from the nearby existing geothermal plant.

Proposed Mitigation

Implementing construction best management practices and mitigation measures contained in Appendix D of the Geothermal PEIS (BLM and Forest Service 2008) would reduce the potential for impacts on wild horses and burros under Alternative A. Specifically, ensuring that construction and operation activities do not harass animals (page D-16), especially during critical reproductive seasons such as breeding and birthing, would minimize potential impacts on wild horses and burros.

Recreation

Construction noise may temporarily impact the recreation setting, in turn affecting experiences of isolation and remoteness, and reducing the potential for positive recreation outcomes. The greatest potential for this effect would be in the Nightingale SRMA. These impacts would be temporary, lasting the duration of construction in the SRMA, which is expected to be on the order of several days to a few weeks.

There would be no impacts on recreation in or near the AOI from construction or operational noise. This is because the existing San Emidio power plant, approximately 0.5 mile north of the proposed plants, already generates operational noise in the area (see **Section 3.2.13**). Anticipated noise from Alternative A, especially north of the proposed power plants, would be largely imperceptible from noise

associated with the existing plant. There would be higher ambient noise levels south of the proposed plants where ambient noise levels are currently lower because of the further distance from the San Emidio facility. However, the lack of existing recreation opportunities in this area would reduce the potential for adverse effects. Alternative A would comply with the BLM regulation that mandates that noise at 0.5 mile—or at the lease boundary if closer—from a major geothermal operation should not exceed 65 dBA (43 CFR 3200.4[b]).

Proposed Mitigation

There would be no specific mitigation measures for recreation. However, implementing measures to avoid, reduce, or mitigate noise-related impacts on other resources would directly and indirectly reduce the potential for noise from Alternative A to affect the recreation setting or experiences.

Range

Noise from gen-tie stringing may temporarily disturb animals in grazing allotments along the proposed alignment. Effects would be temporary and similar to those described for *Wild Horses and Burros*.

Proposed Mitigation

There would be no specific mitigation measures for range. However, implementing measures to avoid, reduce, or mitigate noise-related impacts on other resources would directly and indirectly reduce the potential for noise from Alternative A to disrupt or displace grazing livestock.

Effects from Alternative B: No Action Alternative

There would be no construction-related noise because there would be no construction; thus, the effects on wildlife, range, wild horses and burros, and recreation as described for Alternative A would not occur. Animals may continue to avoid the existing geothermal plant area due to operational noise, as described above. Noise from maintenance on existing infrastructure, previously authorized exploration drilling (BLM 2010), and existing plant operation could affect wildlife, range, wild horses and burros, and recreationists in or near the project area. The effects would generally be as described for Alternative A, above.

3.3.3 Issue 2: How would geothermal fluid utilization affect geology, water resources, and use of water rights?

Analysis Area and Assumptions

The analysis area for most resources analyzed under this issue is the San Emidio Desert cataloging unit (BLM 2020b). The analysis areas for socioeconomics and environmental justice are defined in **Section 3.2.11**.

Effects from Alternative A: Proposed Action

Water Resources

Effects on surface water quality are unlikely because there are no perennial streams or other surface waters in the project area. Further, soil erosion protection measures would be implemented, as described under *Issue 3*, below; examples are using BMPs for cut and fill activities and access roads and implementing a stormwater pollution prevention plan. As such, there would be no effects on surface water quality.

Impacts on groundwater quality from geothermal reservoir waters mixing with the shallow groundwater aquifer would not occur, outside of the amount of mixing that occurs naturally as described in **Section 3.2.1**.

The air-cooled, binary geothermal plants are not anticipated to consume geothermal water resources, and geothermal fluids used in production would be reinjected into the geothermal reservoir. This would minimize the potential that geothermal reservoir pressures could fall as a result of geothermal utilization. This would in turn minimize the potential that utilization would alter water quantity by reducing water levels of groundwater aquifers that may have a hydrologic connection to the geothermal reservoir, such as in the outflow zone north and northwest of the geothermal unit (BLM 2020b).

If geothermal fluids are used during construction, they would not be reinjected into the reservoir. As described in **Section 2.1.1.7**, Water Use, construction would use up to approximately 50,000 gallons of water per day for two months and 5,000 gallons per day for six months thereafter for dust control, and some or all of this requirement may be geothermal fluid. Though the precise volume of the geothermal reservoir is not known, the amount required for construction likely represents a small fraction of its overall volume. Thus surface water alterations are not anticipated to occur as a result of geothermal fluid use for construction purposes.

During short- and long-term well testing (see **Section 2.1.1.3**, Well Field), geothermal fluids would be discharged to the reserve pits, containers, or to the ground surface. This could affect the volume of groundwater aquifers that may have a hydrologic connection to the geothermal reservoir. The precise volume of the geothermal reservoir is not known; however, the volume of fluid withdrawn during the relatively short-duration well tests would be up to approximately 1.5 million gallons per short-term test and up to 15 million gallons per long-term test. This is expected to be minor, compared with the volume of fluid available in the geothermal resource. Removing geothermal fluid during testing would not be expected to affect groundwater resources.

As described in **Section 3.2.1** and the Hydrogeologic Evaluation (BLM 2020b), geothermal fluids naturally mix with the shallow groundwater aquifer along the San Emidio fault in the vicinity of the project area. Thus, additional mixing of geothermal fluids and the shallow groundwater aquifer is not expected to significantly alter shallow groundwater quality. Additional mixing of geothermal fluids in the reserve pits and the shallow groundwater aquifer is not expected to occur, because bentonite drilling muds discharged into the reserve pits would tend to act as a liner, in the same way they prevent the loss of drilling fluids in the well bore into the surrounding rock.

Geothermal water injection is not anticipated to have impacts on surface or shallow groundwater quality because of the NDEP's Bureau of Water Pollution Control underground injection control permit, which is required for the project's injection program. The permit would require that the injection program be designed and monitored to prevent degradation of underground drinking water sources from geothermal fluid injection.

Environmental protection measures to protect surface and groundwater would be implemented. As such, surface or groundwater contamination from spills of production products, such as diesel fuel or lubricants would be unlikely to occur.

Because the state engineer designated the San Emidio Desert groundwater basin (Basin 22) as over-appropriated, groundwater consumption may affect groundwater quantity; this could affect water levels at groundwater wells in the basin; however, this is not anticipated to occur, because water required for construction would be obtained from geothermal fluid, from an established private source trucked to each construction or drill site, or from shallow water wells drilled from one or more of the proposed drill sites. If shallow water wells were used, the wells would be permitted under a geothermal waiver by the NDWR and approved by the BLM. Anticipated water consumption for construction would be 11.7 acre-feet over 6 months of construction, while water consumption during operation would be 0.37 acre-feet per year. The overall aquifer perennial yield is 4,600 acre-feet per year.

Developing and implementing a groundwater monitoring and reporting program would reduce the potential that vested and other water rights in the vicinity could be indirectly affected. The monitoring and reporting program would also minimize the potential of permittees being unable to fulfill the intended beneficial use of their water rights, such as for watering stock or irrigating crops. Appropriate corrective measures, as determined by Ormat in coordination with the BLM Authorized Officer, would be applied if determined to be necessary as a result of monitoring results. This could include temporarily suspending project operations until discharge rates return to appropriate levels.

As described in the Hydrogeologic Evaluation (2020b), connectivity between the geothermal resource in the San Emidio Desert and adjacent undeveloped geothermal resources is unlikely. Proposed geothermal utilization, including reinjecting cooled geothermal fluids, is not anticipated to affect adjacent geothermal resources or the possibility of developing these resources in the future. Similarly, there is no direct connection between the geothermal resource in the San Emidio Desert and groundwater and surface water resources in adjacent hydrographic basins such as the Pyramid Lake Valley groundwater basin (Basin 81); thus, Alternative A is not anticipated to have effects on groundwater or surface water quality or quantity in adjacent hydrographic basins or on Pyramid Lake.

Proposed Mitigation

Implementing applicant-committed environmental protection measures (see **Section 2.1.3**) would reduce the potential for effects on water resources from geothermal fluid utilization. Specifically, geothermal fluids would not be discharged to the ground under normal operating conditions, and maintenance measures would minimize the potential for accidental discharges. Should accidental discharges occur, measures in a spill prevention, control, and countermeasure plan (**Appendix B**) would be implemented. Ormat would also follow stormwater BMPs, and minimize cut and fill activities, to minimize the potential for erosion from stormwater runoff.

Implementing BLM-required stipulations (**Table 3-9**) would further minimize the potential for effects on groundwater resources. The shallow groundwater aquifer would be monitored to allow early detection of potential changes. Ormat would prepare a hydrologic monitoring program outlining monitoring locations, parameters, frequency, and duration, for BLM Authorized Officer approval prior to drilling activities. If water quality effects in groundwater aquifers were detected, appropriate measures to mitigate effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented.

Geology

Under certain circumstances, increased pore pressures resulting from fluid injection for waste disposal, secondary recovery, geothermal energy, or solution mining can trigger earthquakes (Nicholson and Wesson 1990); thus, injecting cooled geothermal fluids could induce earthquakes. This potential varies depending on several factors, such as the injection site's proximity to a fault or fracture and the hydrologic properties of the receiving reservoir. For example, for a given volume of fluid, higher values of transmissivity and storability allow for lower injection pressures so as to attain a desired injection rate and, consequently, a lower potential for triggering earthquakes (Nicholson and Wesson 1990).

As discussed in the Department of Energy's Protocol for Addressing Induced Seismicity Associated with Enhanced Geothermal Systems (EGS; Majer et al. 2012) and the Best Practices for Addressing Induced Seismicity Associated with Enhanced Geothermal Systems (Majer et al. 2016), earthquakes induced in EGS fields generally range from magnitude 2 (insignificant) to about 3.5 (locally perceptible to humans). Because Alternative A does not include EGS, the potential for induced seismicity may be reduced, but it is not negligible. This is because fluid injection is a component of both EGS and conventional geothermal energy development.

Direct impacts on surface geology would be limited to the pads, sumps, and containment basins, due to the construction of these features and well drilling. These impacts would last until the beginning of any required reclamation.

Proposed Mitigation

There would be no specific mitigation measures for geology.

Wildlife

As described in the analysis for *Water Resources*, above, monitoring the shallow groundwater aquifer would allow early detection of potential changes; if effects were detected, appropriate measures, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. Thus, Alternative A is not anticipated to affect water availability for wildlife at area springs or wells in the long term.

Limiting discharges of geothermal fluids to the ground surface during sensitive time periods for wildlife species would minimize the potential that wildlife would ingest geothermal fluids. For example, big game species may be more likely to be present at the San Emidio Desert Valley floor in winter, meaning they would be more likely to use geothermal fluids as a water source if present during this time.

The groundwater systems in the San Emidio Desert are not interconnected to those in the Pyramid Lake Valley groundwater basin (Basin 81). This lack of interconnection (BLM 2020b) indicates that proposed geothermal utilization would not affect groundwater quantity or quality in the Pyramid Lake Basin or associated habitat conditions for Lahontan cutthroat trout or cui-ui in Pyramid Lake. There would be no effect on these species or their habitat.

Proposed Mitigation

Implementing applicant-committed environmental protection measures (see **Section 2.1.3**) would reduce the potential for effects on wildlife from exposure to geothermal fluid utilization. Specifically, geothermal fluids would not be discharged to the ground under normal operating conditions, and

maintenance measures would minimize the potential for accidental discharges. Should accidental discharges occur, measures in a spill prevention, control, and countermeasure plan (**Appendix B**) would be implemented. Ormat would also follow stormwater BMPs, and minimize cut and fill activities, to minimize the potential for habitat loss and degradation from erosion.

Implementing BLM-required stipulations (**Table 3-9**) would further minimize the potential for effects on wildlife resources. The shallow groundwater aquifer would be monitored to allow early detection of potential changes, minimizing the potential that there would be changes in water quality or quantity at wells or springs used by wildlife. If water quality or quantity effects were detected, appropriate measures to mitigate effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented.

To minimize the potential that wildlife would ingest geothermal fluids, Ormat would coordinate with the BLM WDO to obtain approval prior to discharging geothermal fluids to the ground surface during short- and long-term well testing activities. Discharges may be limited during sensitive time periods for wildlife species.

Wild Horses and Burros

Effects on wild horses and burros from changes in water availability at springs or other water sources in the San Emidio Desert would be the same as described in the analysis for *Wildlife*, above. There would be no changes in water availability at Sage Hen Springs in the Nightingale Mountains HA/HMA.

Proposed Mitigation

There would be no specific mitigation measures for wild horses and burros. However, implementing measures to avoid, reduce, or mitigate geothermal fluid utilization-related impacts on other resources would directly and indirectly reduce the potential for geothermal fluid utilization from Alternative A to affect water availability for wild horses and burros at wells or springs.

Range

The effects on livestock water availability would be the same as those described in the analysis for *Wildlife*, above; the effects on water rights holders would be the same as those described in the analysis for *Water Resources*, above.

Proposed Mitigation

There would be no specific mitigation measures for range. However, implementing measures to avoid, reduce, or mitigate geothermal fluid utilization-related impacts on other resources would directly and indirectly reduce the potential for geothermal fluid utilization from Alternative A to affect water availability for livestock at wells or springs.

Socioeconomics and Environmental Justice

The currently producing geothermal reservoir at the SEGU and the geothermal reservoirs south of the unit on the PLPT Reservation do not interconnect (BLM 2020b). This indicates that proposed geothermal utilization would not affect the PLPT's ability to develop the geothermal resource on the reservation in the future.

As described in the analyses for *Water Resources*, above, the effects on permittees' ability to use their water rights as intended, such as for irrigation, are not anticipated. Further, monitoring, as described above, would identify any effects, and appropriate corrective measures, as determined by the BLM Authorized Officer, would be applied.

Construction would provide a short-term increase in employment for approximately 9 months. Temporary employment would be unlikely to have a significant impact on local economic conditions. Construction would likely result in short-term induced economic effects, which are changes to the local economy from purchasing materials to supply the project. Workers may increase demand for temporary housing in community centers in the region, but this effect would last only for the duration of the approximately 9-month construction period.

Proposed Mitigation

There would be no specific mitigation measures for socioeconomic or environmental justice. However, implementing measures to avoid, reduce, or mitigate geothermal fluid utilization-related impacts on other resources would directly and indirectly reduce the potential for geothermal fluid utilization from Alternative A on to affect the ability of the PLPT to develop the geothermal resource on the reservation in the future, or on permittees' ability to use their water rights as intended.

Effects from Alternative B: No Action Alternative

There would be no increase in the potential for effects on surface water, groundwater, geothermal fluids, or use of water rights, compared with current conditions. There would be no changes in water availability for wildlife, livestock, or wild horses and burros at springs or wells in the analysis area. There would be no changes in habitat conditions for Lahontan cutthroat trout or cui-ui in Pyramid Lake.

There would be no increase in the potential for induced seismicity because increased injection, relative to current conditions, would not occur. The potential would continue for induced seismicity from geothermal fluid injection associated with the existing geothermal production in the project area.

There would be no changes in the ability of the PLPT to develop the geothermal resource on their reservation. There would be no change in the quantity or quality of available groundwater at groundwater wells in the San Emidio Desert; thus, there would be no environmental justice concerns.

There would be no changes to the socioeconomic conditions in the region, including from short-term economic contributions from construction employment or temporary demand for housing.

3.3.4 Issue 3: How would sensitive resources be affected by surface disturbance during construction, operations, and maintenance?

Analysis Area and Assumptions

The analysis area for direct effects is the project area; the analysis area for indirect effects is the project area, plus a 650-foot buffer around this area. The buffer is defined as the distance that fugitive dust or surface water runoff and erosion could travel from surface disturbance. This distance is based on typical Nevada BLM geothermal lease stipulations for surface disturbance buffers.

Effects from Alternative A: Proposed Action**Water Resources**

Because stormwater BMPs would be implemented consistent with NDEP Bureau of Water Pollution Control requirements, increased water-driven soil erosion and sedimentation into ephemeral drainages from surface disturbance during construction or operations is not anticipated to occur.

Proposed Mitigation

Implementing applicant-committed environmental protection measures (see **Section 2.1.3**) would reduce the potential for effects on water resources from surface disturbance. Specifically, stormwater BMPs would be followed, such as minimizing cut and fill activities and dissipating stormwater runoff to reduce erosion.

Vegetation

Construction in the AOI, including the proposed power plants, well pads, new and improved roads, pipelines, and aggregate pit, would temporarily remove approximately 189.9 acres of vegetation, as summarized in **Table 2-1**. Of this, approximately 60.4 acres would be reclaimed following the methodology in **Section 2.1.4**; the rest, approximately 129.5 acres, would not be reclaimed. Acres of proposed temporary and permanent vegetation removal in the AOI are summarized in **Table 3-10**.

Table 3-10
Vegetation Removal

SWReGAP Cover Type	Total Acres	Temporary Removal (AOI)	Permanent Removal (AOI)	Temporary Removal (Gen-Tie)	Permanent Removal (Gen-Tie)
Invasive Annual Grassland	1,893.7	1.4 (<1%)	0.9 (<1%)	201.2 (11%)	21.1 (1%)
Intermountain Basins Mixed Salt Desert Scrub	1,393.7	54.0 (4%)	34.1 (2%)	161.1 (12%)	11.7 (1%)
Intermountain Basins Greasewood Flat	986.7	98.4 (10%)	68.5 (7%)	8.7 (1%)	0.1 (<1%)
Intermountain Basins Big Sagebrush Shrubland	978.7	17.7 (2%)	10.9 (1%)	216.8 (22%)	6.9 (1%)
Invasive Annual and Biennial Forbland	481.8	0.0 (0%)	0.0 (0%)	11.8 (2%)	0.1 (<1%)
Great Basin Xeric Mixed Sagebrush Shrubland	97.0	0.0 (0%)	0.0 (0%)	30.2 (31%)	4.7 (5%)
Intermountain Basins Semidesert Grassland	74.2	7.8 (10%)	5.7 (8%)	8.7 (12%)	0.1 (<1%)
Recently Mined or Quarried	49.9	0.0 (0%)	0.0 (0%)	0.0 (0%)	0 (0%)
Intermountain Basins Playa	46.7	2.4 (5%)	1.6 (3%)	0.0 (0%)	0 (0%)
Disturbed	32.1	8.2 (26%)	7.8 (24%)	1.8 (6%)	0 (0%)
Total	6,034.5	189.9 (3%)	129.5 (2%)	640.3 (11%)	44.6 (1%)

Source: Ormat GIS 2019

Construction of the proposed gen-tie would temporarily remove approximately 640 acres of vegetation. Vegetation removal would be for temporary work areas at each structure site and at several stringing sites and angle points. After construction, these areas would be reclaimed, with the exception of an approximately 20-foot by 30-foot maintenance pad at each structure site. Additional permanent

vegetation removal would be for new access spur roads. Permanent vegetation removal, therefore, would total approximately 45 acres. This information is summarized in **Table 3-10**.

Periodic vegetation removal within approximately 4 feet of gen-tie poles would occur as conditions warrant, as part of wildfire risk management. This would be done as needed within the permanent maintenance pad area, described above. Shrubby vegetation would be removed by trimming or other manual methods, while annual vegetation would receive herbicide application consistent with the BLM's 2007 Vegetation Treatments Final PEIS. Treatments would take place concurrent with regular ROW maintenance, or more frequently as warranted by vegetation conditions and potential wildfire risk.

There would be no additional vegetation removal associated with temporary material storage yards for gen-tie construction materials. This is because these areas would be on existing well pads or the power plant site at the gen-tie northern end.

Direct effects on special status plants would not occur. This is because surveys did not document special status plants in the project area, and because pre-construction surveys would be conducted, and any observed populations would be avoided during construction.

Indirect effects on special status plants would include habitat loss for Tonopah milkvetch, oryctes, and Nevada dune beardtongue. Temporary disturbance from construction in the AOI would occur on approximately 77 acres of suitable habitat for these species, rendering habitat unsuitable. Though most areas of temporary disturbance in special status plant habitat in the AOI would be reclaimed following construction, habitat suitability would likely take decades or more to return, if at all, effectively making this effect permanent.

Similarly, indirect effects on special status plant habitat would occur from proposed gen-tie construction. Temporary disturbance in special status plant habitat in the gen-tie ROW would occur on approximately 107 acres. As above, while all but approximately 3 acres would be reclaimed, since habitat suitability may not be restored in reclaimed areas, this effect would be considered permanent.

Implementing noxious weed measures would minimize, but not prevent, the potential that ground disturbance would result in noxious weed and nonnative, invasive plant establishment and spread.

Implementing fugitive dust control measures would minimize, but not prevent, the potential that vegetation would be indirectly affected by fugitive dust generated during ground disturbance. Fugitive dust can settle on nearby vegetation, reducing its productivity.

Proposed Mitigation

Implementing applicant-committed environmental protection measures (see **Section 2.1.3**), including minimizing cross-country travel, using existing roads whenever possible, maintaining access roads consistent with road development BMPs, and minimizing cut and fill activities, would reduce the potential for Alternative A to remove vegetation during construction and operation. Reclaiming temporarily disturbed areas, using BLM-approved revegetation methods, and stockpiling topsoil would retain intact soil conditions that supports revegetation success following temporary disturbance.

Developing and implementing an invasive plant management plan and requiring all contractors to power wash their vehicles and equipment, including the body and undercarriage, before bringing them onto

BLM-administered lands would prevent the spread of invasive, nonnative species. Ensuring all gravel and fill material is certified as weed free would further prevent the spread of invasive, nonnative species.

Implementing BLM-required stipulations (**Table 3-9**) would minimize the potential for effects on special status plant species. Ormat would conduct pre-construction surveys in proposed disturbance areas to supplement those conducted for the biological baseline report (see Section 3.1.2 of BLM 2020a). If pre-construction surveys indicate the presence of the same species of concern as documented in the biological baseline report, then the same measures to avoid, minimize, or mitigate impacts would be applied. If pre-construction surveys indicate the presence of a species of concern not already documented in the report, then additional NEPA documentation would occur. Measures to avoid, minimize, or mitigate impacts would be developed during that NEPA process.

As described in **Table 3-9**, if a special status plant species is identified during construction, work near the species would be halted, and a qualified biologist would be consulted to determine an appropriate buffer and other protective measures. The appropriate resource agencies would be notified of the discovery within 24 hours. If avoidance is infeasible, consultation with the jurisdictional resource agency would be conducted prior to continuing work in the immediate area of the species.

Wildlife

Alternative A would temporarily and permanently remove habitats for special status species other than dark and pale kangaroo mice, as summarized in **Table 3-11**. Temporary and permanent habitat removal for kangaroo mice is summarized in **Table 3-12**.

The duration of the temporary effects described above would vary, depending on the habitat type affected. For example, burrowing owls and some generalist migratory birds, such as common ravens, horned larks, and meadowlarks, can inhabit relatively disturbed habitats lacking intact, native vegetation; thus, these species may be able to reoccupy temporarily disturbed and restored areas relatively quickly.

Table 3-11
Wildlife Habitat Removal

Habitat Type	Total Acres ¹	Temporary Removal (AOI)	Permanent Removal (AOI)	Temporary Removal (Gen-Tie)	Permanent Removal (Gen-Tie)
Burrowing owl	5,509	189.9 (3%)	129.5 (2%)	505 (9%)	26 (<1%)
Migratory birds	6,034	189.9 (3%)	129.5 (2%)	640 (11%)	45 (1%)
Insects	740	20.7 (3%)	11.5 (2%)	101 (14%)	3 (<1%)
Reptiles	6,034	189.9 (3%)	129.5 (2%)	640 (11%)	45 (1%)
Greater sage-grouse OHMAs (2019 RMP Amendment)	0	0.0 (0%)	0.0 (0%)	0.0 (0%)	0.0 (0%)
Greater sage-grouse OHMAs (2015 RMP Amendment)	685	0.0 (0%)	0.0 (0%)	113 (16%)	2 (<1%)

Source: Ormat GIS 2019, BLM 2020a

Table 3-12
Kangaroo Mouse Habitat Removal

Habitat Type	Total Acres¹	Temporary Removal (AOI)	Permanent Removal (AOI)	Temporary Removal (Gen-Tie)	Permanent Removal (Gen-Tie)
Dark kangaroo mouse high potential	8,403	176.8 (2%)	118.6 (1%)	154 (2%)	12 (<1%)
Dark kangaroo mouse medium potential	962	0.0 (0%)	0.0 (0%)	35 (4%)	5 (<1%)
Dark kangaroo mouse low potential	3,444	13.1 (<1%)	11.0 (<1%)	25 (1%)	0 (0%)
Dark kangaroo mouse non-habitat	730	0.0 (0%)	0.0 (0%)	15 (2%)	0 (0%)
Pale and dark kangaroo mouse high potential	6,059	0.0 (0%)	0.0 (0%)	217 (4%)	6 (<1%)
Pale and dark kangaroo mouse medium potential	435	0.0 (0%)	0.0 (0%)	13 (3%)	1 (<1%)
Pale and dark kangaroo mouse low potential	4,406	0.0 (0%)	0.0 (0%)	170 (4%)	20 (<1%)
Pale and dark kangaroo mouse non-habitat	1,298	0.0 (0%)	0.0 (0%)	41 (3%)	2 (<1%)

Source: Ormat GIS 2019, BLM 2020a

¹ As described in **Section 3.2.4**, the kangaroo mouse habitat delineation was done in a larger area than the 6,034-acre project area; the habitat delineation area included the AOI, gen-tie alignment, and a 0.25-mile buffer around these areas, which is approximately 25,736 acres.

In contrast, some migratory bird species that may be less tolerant of fragmented or disturbed habitats, such as Brewer's sparrow, black-throated sparrow, and sage sparrow, may not reoccupy temporarily disturbed habitats for longer periods. Similarly, kangaroo mice typically require relatively undisturbed habitats with intact native vegetation. Temporarily disturbed suitable habitat, even if restored, can take a relatively long time to regain suitability. Even if habitat suitability is restored, this does not always allow for species recolonization after habitat has been impacted.

There is an active burrowing owl burrow approximately 400 feet from a proposed temporary pole site work site along the southern portion of the gen-tie alignment, and another active burrow within approximately 800 feet of new road construction proposed in the AOI. Both of these burrows are within 150 to 200 feet of existing access roads, transmission lines, or well pads.

As discussed in *Vegetation*, above, adhering to noxious weed and fugitive dust measures would minimize, but not prevent, indirect effects on wildlife habitat from weed establishment and spread and fugitive dust deposition.

Proposed Mitigation

Implementing BLM-required stipulations (**Table 3-9**) would minimize the potential for effects on wildlife. Ormat would conduct pre-construction surveys in proposed disturbance areas to supplement those conducted for the biological baseline report (see Section 3.1.2 of BLM 2020a). If pre-construction surveys indicate the presence of the same species of concern as documented in the biological baseline report, then the same measures to avoid, minimize, or mitigate impacts would be applied. If pre-construction surveys indicate the presence of a species of concern not already documented in the

report, then additional NEPA documentation would occur. Measures to avoid, minimize, or mitigate impacts would be developed during that NEPA process.

An adaptive approach incorporating burrowing owl surveys, monitoring, and protective measures as necessary, would be done in areas not already surveyed for this species during preparation of the baseline biological report (**Table 3-9**; BLM 2020a).

Temporarily disturbed areas would be reclaimed as soon as is feasible according to a required habitat restoration plan (**Table 3-9**). The plan would identify revegetation, soil stabilization, and erosion reduction measures that would be implemented to ensure that all temporary use areas are restored. The plan would require that restoration occur as soon as possible after completion of activities to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats.

Ormat would avoid, minimize, and restore impacts in kangaroo mouse habitats according to the BLM-required stipulations in **Table 3-9**. Developing and implementing a BLM-approved monitoring plan to enable informed management and land use decisions would contribute to improvements in long-term management and conservation of kangaroo mice in the region.

As described in **Table 3-9**, if a special status wildlife species is identified during construction, work near the species would be halted, and a qualified biologist would be consulted to determine an appropriate buffer and other protective measures. The appropriate resource agencies would be notified of the discovery within 24 hours. If avoidance is infeasible, consultation with the jurisdictional resource agency would be conducted prior to continuing work in the immediate area of the species.

Recreation

As discussed in *Vegetation*, above, adhering to fugitive dust measures would minimize, but not prevent, the potential for short-term modifications to the backcountry setting in portions of the project area from fugitive dust generation. The greatest potential for this effect would be in the Nightingale SRMA, during grading for gen-tie laydown areas and pole placement sites. This is because fugitive dust would be visible from the SRMA and other areas of dispersed recreation. These impacts would be temporary, lasting the duration of construction in this area, which would be in the order of several days to a few weeks. There would be no impacts on recreation near the AOI because of a lack of existing recreation opportunities and a negligible change in the setting, compared with current conditions.

Proposed Mitigation

Implementing applicant-committed environmental protection measures (see **Section 2.1.3**) would reduce the potential for effects on recreation from dust generation. Specifically, fugitive dust control measures would include compacting construction-disturbed areas, placing gravel on access roads, and watering construction areas.

Soil Resources

The approximate acres of temporary and permanent soil disturbance correspond with the amount of temporary and permanent vegetation removal. This information is discussed under *Vegetation*, above (see **Table 3-10**).

Where surface disturbance is proposed, implementing environmental protection measures as described for the resources above would minimize, but not prevent, the potential for soil erosion by wind or water. Residual effects may include increasing erosion rates from site grading or by reducing soil productivity and the potential for successful restoration. This would come about by exposing soil surfaces, which would increase the potential for wind- and water-driven erosion. There could also be effects from compacting the soil to a level that prevents or slows successful restoration and eventual reestablishment of vegetation.

The region has the potential for high winds and infrequent strong rains, which could increase erosion rates and soil loss. The use of vehicles and equipment on disturbed areas could further increase the potential for wind- and water-driven erosion and contribute to soil compaction, thus reducing restoration potential.

Soil ratings of the most prevalent soil map units in the project area suggest that the susceptibility of these soils to wind erosion is generally low; an exception is the 1410-Slipback-Shawave-Nodur association, which is relatively susceptible. This unit occurs along the gen-tie alignment. Values for susceptibility to sheet and rill erosion by water varies, depending on the unit, but it ranges from relatively high to low susceptibility.

Although measures would reduce the potential for wind- and water-driven erosion and soil compaction and would help maintain soil restoration potential, localized topsoil loss due to wind- and water-driven erosion and soil compaction is still expected to occur.

Proposed Mitigation

Following applicant-committed environmental protection measures (see **Section 2.1.3**), including BLM stormwater BMPs, would minimize the potential for Alternative A to erode soils. Specifically, cut and fill activities would be minimized when selecting the power plant sites and pipeline routes and off-site stormwater would be intercepted in ditches and channeled to energy dissipaters around the power plants. Restricting cross-country travel, using existing roads whenever possible, maintaining access roads consistent with road development BMPs, and implementing a stormwater pollution prevention plan, as required by the NDEP Bureau of Water Pollution Control (see **Table 3-9**), would further reduce the potential for soil erosion. Reclaiming temporarily disturbed areas, using BLM-approved revegetation methods, and stockpiling topsoil to enhance revegetation access would retain intact soil conditions that support revegetation success.

Cultural Resources

Because all NRHP-eligible and unevaluated sites in the APE would be avoided during construction and maintenance, and an archaeological monitor would be present during ground-disturbing activity within 30 meters (98 feet) of NRHP-eligible and unevaluated sites to ensure sites are not disturbed, direct effects from ground disturbance or periodic vegetation removal on eligible or unevaluated sites are not expected to occur.

Indirect effects on the California Trail are expected, because the proposed gen-tie crosses it near the Eagle Substation. Temporary impacts would occur from visual intrusion of construction activity and restricted access during the gen-tie construction, but they would be minimal and limited to the period of

construction, which is expected to last from several weeks to a month. The integrity of setting, feeling, and association of the California Trail would not be significantly impacted in the long term.

No significant indirect effects on other cultural resources are expected to occur.

Proposed Mitigation

Following applicant-committed environmental protection measures (see **Section 2.1.3**) would minimize the potential for direct adverse effects on NRHP-eligible and unevaluated resources because these resources would be avoided. As outlined in the BLM-required stipulations (**Table 3-9**), when ground-disturbing project activities are proposed within 30 meters (98 feet) of an NRHP-eligible or unevaluated cultural resource, an archaeological monitor would be present to ensure that sites are avoided and not disturbed during construction and maintenance. Temporary or permanent fencing around NRHP-eligible or unevaluated cultural resources may be installed to prevent disturbance, and personnel would be instructed that all cultural resources are protected.

Special Designations and Visual Resources

Special Designations

Construction activity may generate dust that would be temporarily visible from the Fox Range and Mount Limbo WSAs. Visible dust would diminish the naturalness character of the WSA. These impacts would last only for the duration of construction.

Visual Resources

Surface-disturbing activities would also result in temporary and permanent changes to the existing landscape as visible from KOPs (see **Appendix E**). Linear and vertical forms and lines within the land and vegetation would be added to the landscape from vegetation clearing. Changes in land and vegetation would occur from new line edges and interrupted continuity along with changes in form shapes. The activity from construction would increase the amount of motion present, drawing attention to viewers at KOPs. However, visual changes would have a weak contrast to the landscape character. The activity would be seen but would not dominate the attention of the casual viewer.

Proposed Mitigation – Special Designations and Visual Resources

Controlling fugitive dust through construction BMPs and adhering to speed limits on construction access roads would minimize the amount of dust generated by construction traffic, vegetation removal, or surface disturbance during construction, including in the geothermal unit AOI and the gen-tie. Additionally, complying with air quality requirements prescribed by the Nevada Department of Environmental Protection, Bureau of Air Pollution Control, which would require Alternative A to avoid compacting construction-disturbed areas, placing gravel on access roads, and watering construction areas, would avoid fugitive dust generation. These measures would minimize the potential for fugitive dust to diminish naturalness character and change the viewshed as visible from identified KOPs (**Appendix E**). Reclaiming temporarily disturbed areas following construction would reduce Alternative A's visual contrast and avoid long-term direct and indirect impacts on visual resources from unnatural forms and lines.

Effects from Alternative B: No Action Alternative

Surface disturbance from construction would not occur. As a result, the potential for water-driven erosion and sedimentation would not increase. Similarly, there would be no effects from construction on wildlife habitats, NRHP-eligible or unevaluated properties, or vegetation, including special status plant species.

Operation and maintenance associated with current geothermal production infrastructure, as well as previously authorized vegetation removal for exploration well pads (BLM 2010), may remove limited amounts of vegetation, cause localized soil losses, contribute to weed establishment and spread, and degrade wildlife habitats in the project area. If undiscovered cultural resources were revealed during previously authorized disturbance (BLM 2010), direct or indirect effects may result, though measures are in place to reduce these effects.

There would be no dust generated by the proposed construction because Alternative A would not be constructed. Dust generated by passenger vehicle traffic on existing dirt roads in the project area would continue to be visible from WSAs and to be visible to other receptors in the area.

3.3.5 Issue 4: How would the physical presence and design of the proposed infrastructure influence resources and resource use conditions?***Analysis Area and Assumptions***

The analysis area for both direct and indirect effects is the project area. The analysis area for indirect effects on cultural resources is defined as the indirect APE for cultural resources; the indirect effects analysis area for special designations and visual resources is the viewsheds from which proposed infrastructure would be visible.

Effects from Alternative A: Proposed Action***Wildlife***

The presence of the gen-tie may increase avian or bat injury or mortality due to collisions. Bats that cannot actively echolocate may fail to detect transmission lines or poles when in flight. Similarly, avian species may fail to see or distinguish the lines. If they spot the transmission lines during flight, heavy-bodied, less agile birds or birds in large flocks may lack the ability to quickly negotiate the lines, making these birds more susceptible to a potential collision.

Incorporating APLIC guidelines (APLIC 2006, 2012) into gen-tie design would minimize, but not prevent, the potential for injury or mortality from avian electrocution. This can occur when a bird simultaneously contacts energized or grounded structures, conductors, hardware, or equipment (APLIC 2006).

Raptors and corvids, such as crows, ravens, jays, and magpies, may benefit from the presence of transmission lines, because they provide more roosting or nesting opportunities (Steenhof et al. 1993); however, nests built near energized conductors and hardware may pose an electrocution risk. The gen-tie also may increase predation on wildlife species. This is because the gen-tie structures would provide improved perching locations for raptors and corvids.

Incorporating greater sage-grouse RDFs in OHMA on BLM-administered lands would minimize the potential for indirect effects on greater sage-grouse from increased predation threat and reduced habitat quality. These effects may be unlikely to occur in the project area, because the proposed gen-tie closely

parallels the existing LADWP 500 kV transmission line, meaning that individuals are less likely to be present in habitat areas.

Proponents of projects that would involve human disturbances in or within 3.7 miles of PHMA, GHMA, or OHMA are required to consult with the Nevada Sagebrush Ecosystem Technical Team to determine if mitigation is necessary. The BLM has coordinated with this team, which has not recommended any additional habitat quantification or mitigation measures beyond those already proposed in this EA.

Lights on drill rig derricks would pulse at the minimum intensity and minimum number of flashes per minute allowable by Federal Aviation Administration or other applicable regulations. Minimizing lighting would reduce, but not avoid, the potential for avian injury or mortality during drilling operations, as a result of birds striking drill rigs. Bird strikes may be particularly pronounced for night-migrating species, which may become disoriented by nighttime lights on tall structures, particularly during inclement weather (Rich and Longcore 2006).

Using wildlife-friendly fencing, netting, or other coverings to exclude wildlife from ponds, tanks, and impoundments, including drill reserve pits, containing hot or contaminated liquids and other constituent chemicals would minimize the potential for hazards to migratory birds, bats, and other wildlife from exposure to detrimental substances.

Vehicles can collide with wildlife, causing injury or mortality. There may be an additional risk for scavenger species, such as turkey vultures (*Cathartes aura*), ravens, and raptors, foraging along roads. Also, risks may increase for perching bird species, such as horned larks, whose concentrations have been observed to increase along newly constructed roads in sagebrush habitats (Inglefinger and Anderson 2004). Risks from road use would be greater during project construction than operation due to the higher volume of construction traffic.

Proposed Mitigation

Implementing applicant-committed environmental protection measures (see **Section 2.1.3**) and BLM-required stipulations (**Table 3-9**) would reduce the potential for effects on wildlife from the physical presence of proposed infrastructure. Specifically, power plant sites, permanent well pads, and pits would be fenced to prevent wildlife entry, and wellhead cellars would be covered to prevent wildlife entrapment. The proposed gen-tie would comply with raptor protection standards described in the Suggested Practices for Raptor Protection on Power Lines, The State of the Art in 2006 (APLIC 2006). All power poles would be constructed to be eagle safe and/or utilize raptor anti-electrocution and devices or equipment.

Implementing BLM-required stipulations (**Table 3-9**) would minimize the potential for effects on greater sage-grouse from the proposed gen-tie in OHMA. Greater sage-grouse RDFs (BLM 2015b, Appendix C) would be implemented along the 7 miles of proposed gen-tie that crosses areas mapped as OHMA on BLM-administered lands (BLM GIS 2015).

To minimize the potential for wildlife impacts from exposure to detrimental substances associated with geothermal reserve pits, Ormat would implement applicable measures described in NDOW's *Design Features and Tools to Reduce Wildlife Mortalities Associated with Geothermal Sumps*. Applicable measures would be determined in coordination with the BLM WDO and NDOW.

Cultural Resources

Because the proposed gen-tie would cross the California Trail near the Eagle Substation, there is potential for indirect effects. Temporary impacts would occur from visual intrusion of construction activity and restricted access during the gen-tie construction, but they would be minimal and limited to the period of construction. Permanent impacts to the integrity of setting, feeling, and association of the California Trail would occur where the gen-tie crosses the trail; however the impacts would not be significant.

Potential indirect effects on eligible or unevaluated sites in the AOI may include visual effects caused by construction and presence and use of equipment and the operation of new geothermal plant facilities. The existing San Emidio power plant, approximately 0.5 mile north of the proposed plants, already generates operational noise in the area, and anticipated noise from Alternative A, especially north of the proposed power plants, would be largely imperceptible from noise associated with the existing plant. There would be higher ambient noise levels south of the proposed plants where ambient noise levels are currently lower because of the further distance from the San Emidio facility. However, Alternative A would comply with the BLM regulation that mandates that noise at 0.5 miles—or at the lease boundary if closer—from a major geothermal operation should not exceed 65 dBA (43 CFR 3200.4[b]).

No significant indirect effects on other cultural resources are expected to occur.

Proposed Mitigation

There would be no specific mitigation measures for cultural resources because there would be no significant visual or auditory impacts. However, implementing measures to avoid, reduce, or mitigate visual and auditory impacts on other resources would directly and indirectly reduce the potential for Alternative A to affect the integrity of setting, feeling, and association of cultural resources.

Wild Horses and Burros

Permanent disturbance associated with geothermal development in the AOI would remove rangeland and forage areas for wild horses and burros in the approximately 177,700-acre Fox and Lake Range HA/HMA. This would come about by constructing power plants, fences, well pads, roads, and pipelines. Physical presence of proposed infrastructure may restrict animal movement. This effect would occur in approximately 190 acres, or approximately 0.1 percent, of the HA/HMA. This effect would be further minimized because development under Alternative A would occur next to existing geothermal utilization infrastructure.

Proposed Mitigation

There would be no specific mitigation measures for wild horses and burros that apply to Issue 4.

Land Use and Infrastructure

Placement of the power plants, pipelines, roads, substation, and gen-tie would increase the amount of infrastructure on BLM-administered lands. The proposed gen-tie would be in a designated west-wide energy corridor. There would continue to be opportunities for collocation of future electrical transmission infrastructure in the corridor. The substation could accommodate future connections.

Alternative A would result in a maximum of 50 workers during construction and would have an on-site staff of up to 2 employees during operation. Vehicle trips would include pick-up trucks, drilling rigs, haul

trucks with construction vehicles, and semi-trucks hauling well equipment, power plant equipment and materials, and piping. These vehicles would access the AOI using Rodeo Creek Road. There would be short-term congestion and potential road surface deterioration on Rodeo Creek Road from construction vehicle traffic. There would be no impacts on Rodeo Creek Road during plant operation because less than 5 average daily vehicle trips would be expected for the 1–2 employees.

Proposed Mitigation

There would be no specific mitigation measures for land use and infrastructure. Potential impacts on the Rodeo Creek Road surface would be addressed through normal maintenance performed by Washoe County.

Recreation

Potential impacts on recreation from the physical presence of infrastructure would come from displacing visitors and modifying the backcountry setting. The greatest potential for Alternative A to affect the recreation setting would be in the Nightingale SRMA. Placement of the gen-tie would increase the amount of infrastructure visible from the SRMA and other areas where dispersed recreation occurs; however, because the new line would be in a corridor that already contains a large transmission line, the changes in the backcountry recreation setting or visitor displacement would be negligible. Proposed new and improved access roads would expand motorized and nonmotorized access to recreation opportunities. There would be no impacts on recreation near the AOI because of a lack of recreation opportunities and negligible change in the setting, compared with current conditions.

Proposed Mitigation

There would be no specific mitigation measures for recreation. However, implementing measures to avoid, reduce, or mitigate visual-related impacts on other resources would directly and indirectly reduce the potential for Alternative A to change the backcountry recreation setting.

Special Designations and Visual Resources

Special Designations

Alternative A would conform with BLM Manual 6330, Management of BLM Wilderness Study Areas, which requires an approximately 660-foot setback, or facility modification, for fluid mineral developments that could affect WSA characteristics. The southeast corner of the Fox Range WSA is approximately 2 miles from the southern portion of the AOI, though proposed infrastructure such as well pads and power plants would be approximately 3 miles from the WSA. The proposed air-cooled, binary power plants would not have steam plumes in cold weather, reducing their visibility on the landscape and the potential that they would affect wilderness characteristics in the Fox Range WSA.

The AOI is over 4 miles from the Mount Limbo WSA, but infrastructure in the AOI would not be visible from the WSA because the Lake Range would obscure it.

The non-impairment standard in BLM Manual 6330 stipulates that no new ROWs will be approved for uses that would impair the suitability of such areas for future preservation as wilderness. Alternative A would conform with BLM Manual 6330. The southern portion of the Mount Limbo WSA is less than 1,000 feet from the proposed gen-tie alignment in places. However, the proposed gen-tie ROW parallels the larger LADWP 500 kV transmission line through this area. The proposed ROW is at least 500 feet farther from the WSA boundary than is the 500 kV transmission line. Given the proposed ROW's

location relative to existing infrastructure and design features to minimize visual impacts (see **Section 2.1.3**), the non-impairment standard would not be violated by the proposed ROW placement.

Proposed Mitigation – Special Designations

There would be no specific mitigation measures for special designations. However, implementing applicant-committed environmental protection measures (**Section 2.1.3**) to avoid, reduce, or mitigate visual-related impacts on other resources would directly and indirectly minimize the potential for Alternative A to diminish the naturalness character of these areas.

Visual Resources

The visual contrast rating analysis for the KOPs (**Appendix E**) found that the project components would be visible and would create a contrast with the surrounding landscape. The predominant vegetation is under 3 feet high and would not provide screening of the project. The horizon line would be discontinuous from most KOPs, thereby reducing contrasting impacts on the landscape lines and form. This is because power lines and facilities generally would not protrude above the skyline; however, from some KOPs, project components would protrude above the skyline where it is relatively low in elevation. The project would introduce additional visible elements into the landscape; however, there are already non-natural lines and forms, namely geothermal plant facilities, utility poles and transmission lines, roadways, fence lines, and other human-made structures.

Short-term effects on visual resources would occur during project construction and drilling, when heavy equipment, drill rigs, and other equipment would be present. During drilling operations, the rig would be visible at distances of greater than 1 mile from the respective drill sites. Lights used during night drilling would increase rig visibility, but the lights would be limited to those required to safely conduct the operations. The lights would be shielded or directed to focus light on the immediate work area.

Long-term effects would be minimized by incorporating visual design considerations to minimize visual contrast and to meet the VRM objectives of the area. Project facilities would be painted consistent with BLM visual guidelines, which would further blend the structures into the surrounding landscape.

Long-term effects would also occur from the gen-tie structures and conductor. However, because the proposed line would parallel the larger LADWP 500 kV transmission line for most of its length, the quality of the views as seen from project KOPs (**Appendix E**) would be largely unaffected.

Infrastructure would be noticeable from project KOPs but would not dominate the view of the casual observer. The impact on the characteristic visual landscape would be greatest where existing infrastructure or other forms of visual contrast are not present. Overall, the degree of contrast and modification imposed on the landscape by the project would be moderate or less, which is within the parameters of the VRM Class III objective to partially retain the existing character of the landscape. Accordingly, Alternative A would be in conformance with VRM guidelines and policy (BLM Manual 8400, Manual H-8410-I, and Manual H-8431).

Proposed Mitigation – Visual Resources

Implementing applicant-committed environmental protection measures (see **Section 2.1.3**) would reduce the potential for visual resources effects from the physical presence of proposed infrastructure. Specifically, the paint used on the power plant, pipelines, wellheads, pump motors, and motor control

buildings would be consistent with BLM visual guidelines to blend with the area and minimize their visibility. The overhead conductors used on the gen-tie power poles would have a matte surface to reduce sunlight reflection and glare.

Effects from Alternative B: No Action Alternative

There would be no effects from the presence of the proposed gen-tie, including on the California NHT, because the gen-tie would not be constructed. Effects, as described above, may continue to occur in portions of the project area; this is because there is already infrastructure along the proposed gen-tie alignment.

Rangeland and forage resources in the Fox and Lake Range HA/HMA would not be removed, because Alternative A would not be constructed. Animals may experience movement restrictions in the existing geothermal field area due to the power plant, fences, well pads, roads, and pipelines that are already there.

Wilderness characteristics in the Fox Range and Mount Limbo WSAs would be unchanged, because Alternative A infrastructure would not be built. Existing infrastructure, including the San Emidio power plant and auxiliary buildings, would continue to be visible from the Fox Range WSA, and the LADWP 500 kV transmission line would continue to be visible from the Mount Limbo WSA.

Similarly, there would be no changes to existing form, color, line, or texture, in accordance with BLM VRM guidelines, because Alternative A infrastructure would not be built.

3.3.6 Cumulative Effects

Past, Present, and Reasonably Foreseeable Future Activities

The CEQ defines cumulative effects as “the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal and non-federal) or person undertakes such other actions” (40 CFR 1508.7; CEQ 1997).

To determine which other actions should be included in a cumulative impacts analysis, the region of influence for each resource must first be defined. These regions should not be limited to only the geographic areas of resources addressed by the project; they should also account for the distances that cumulative impacts may travel and the regional characteristics of the affected resources. Unless otherwise noted, the cumulative effects analysis area for geothermal production is the San Emidio Desert. This is a closed hydrologic basin that is not visible from any state road. The cumulative effects analysis area for the gen-tie is the viewsheds in which the gen-tie would be visible. The timescale for analysis is the lifetime of the geothermal leases (10 years) and ROW grant. Generally, a BLM ROW is granted for a term appropriate for the life of the project, which is anticipated to be 50 to 60 years depending upon maintenance operations and climatic conditions. The geothermal leases and ROW grant may be extended or renewed beyond these timelines.

The BLM WDO has identified past, present, and reasonably foreseeable future actions (**Table 3-13**) that overlap both spatially and temporally with Alternative A on BLM-administered lands in the analysis area and thus are relevant for analyses.

Table 3-13
Past, Present, and Reasonably Foreseeable Future Actions

Past, Present, or Reasonably Foreseeable	Action	Brief Description
Past	Locatable mineral exploration and development	Surface disturbance from the Wind Mountain Mine is in the reclamation phase under care and maintenance by Rio Furtuna Exploration. Approximately 820 acres in the cumulative effects analysis area were disturbed by mining and ore processing. The BLM is evaluating mine reclamation annually for revegetation performance. The BLM has determined the bond status is adequate and the notice is active until April 2021.
Present	Lands and realty	A LADWP 500 kV transmission line runs north to south, along the base of the Lake Range. The line passes through the Eagle Substation near Fernley, Nevada. The Eagle Substation is operated by NV Energy.
Present	Fluid mineral exploration and development	Ormat operates the 10 MW San Emidio geothermal plant. Surface disturbance associated with the plant is approximately 64 acres (Ormat 2019). There are also 7 production or injection wells, well pads, and access roads associated with the San Emidio plant and decommissioned AMOR II plant.
Present	Fluid mineral exploration and development	Drilling and testing six geothermal resource exploration wells on BLM-administered land in the SEGU per the 2010 EA (BLM 2010).
Present	Agricultural development	Farming and ranching interests are anticipated to continue at current levels into the foreseeable future. Approximately 1,660 acres are under cultivation on private land in the cumulative effects analysis area (BLM 2010).
Present	Rangeland	The project area crosses portions of the Blue Wing/Seven Troughs, Desert Queen, and Rodeo Creek grazing allotments. There is grazing in the project area, including in the AOI and along the proposed gen-tie. Range improvements consist of watering areas for livestock and some fencing.
Present	Transportation	State Route 447 crosses the proposed gen-tie cumulative effects analysis area east of the Lake Range. There are several unpaved access roads in the project area, including an existing maintenance road that serves the LADWP transmission line. Rodeo Creek Road provides paved and unpaved public access to the AOI and Empire Farms. Washoe County is responsible for maintaining Rodeo Creek Road.
Reasonably foreseeable	Fluid mineral exploration and development	Gerlach Geothermal Development Project, which proposes a new geothermal power plant near Gerlach and an approximately 20-mile-long 120 kV transmission line terminating at the San Emidio substation.
Reasonably foreseeable	Fluid mineral exploration and development	Development of the geothermal resource at the Astor Pass area on the PLPT reservation.

Sources: As noted in the table

Cumulative Effects Analysis

Past, present, and reasonably foreseeable future actions that have affected, and would continue to affect, ambient noise levels in the cumulative effects analysis area are as follows: the existing 10 MW San

Emidio Geothermal Plant, authorized geothermal exploration activities in the SEGU, operation of the LADWP 500 kV transmission line, and traffic on State Route 447 and Rodeo Creek Road.

Those actions that have affected and would continue to affect water resources are the existing and planned geothermal resource utilization and agricultural irrigation water use.

Construction, operation, and maintenance of most of the past, present, and reasonably foreseeable future actions would continue to remove vegetation and disturb soils in the cumulative effects analysis area.

Finally, actions that have contributed to infrastructure presence in the analysis area are primarily existing geothermal utilization in the SEGU, the LADWP 500 kV transmission line, and State Route 447.

When combined with these past, present, and reasonably foreseeable future actions, Alternative A would contribute incrementally to noise levels, the potential for effects on water resources, surface disturbance and associated vegetation removal, and infrastructure in the analysis area, as described below. Implementing applicant-committed environmental protection measures and additional BLM-required stipulations would minimize Alternative A's contribution to the cumulative effects.

Temporary noise would come from constructing and maintaining proposed infrastructure, including from drilling proposed injection and production wells; long-term noise would come from plant operation. Noise generated during construction would affect wildlife, wild horses and burros, and livestock, such as from disturbance and displacement from habitat during construction. Construction noise from the gen-tie would also temporarily impact the recreation setting in the Nightingale SRMA. Long-term noise-related effects are also possible on animals and recreation near the proposed power plants, but since the existing San Emidio power plant already generates operational noise in the area, anticipated noise would be largely imperceptible from noise associated with the existing plant. Further, recreation opportunities are limited in and near the AOI.

Geothermal utilization would have the potential to contribute incrementally to effects on resources in the analysis area. Long-term contributions would occur if geothermal fluid utilization changed groundwater aquifer quality or quantity. This could affect water quality or availability in the San Emidio Desert for wildlife, livestock, wild horses and burros, and water rights holders. Developing and implementing a groundwater monitoring and reporting program would reduce the potential for these effects; if effects were observed, appropriate corrective measures would be applied.

Because there is a lack of connectivity between the geothermal resource in the San Emidio Desert and undeveloped geothermal resources in adjacent hydrologic basins, Alternative A is not anticipated to prevent development of these resources in the future. Similarly, there is no direct connection between the geothermal resource in the San Emidio Desert and groundwater and surface water resources in the Pyramid Lake Valley basin; thus, there would be no contributions to cumulative effects on water quality or quantity in Pyramid Lake, including habitat for listed fish species.

Alternative A would cause surface disturbance, remove vegetation, and increase the potential for water- and wind-driven soil erosion. Surface disturbance in suitable habitat for special status species would result in contributions to cumulative effects on these species and their habitat. The impacts would be incremental, when combined with vegetation removal and soil disturbance from past, present, and future

actions in the analysis area. Temporary contributions would occur from constructing the proposed facilities, including temporary work areas along the gen-tie. Long-term contributions would occur in the footprints of permanent facilities and in maintenance areas that would not be reclaimed after construction. The primary potential impacts associated with this are temporary and permanent vegetation and wildlife habitat removal, soil disturbance increasing the potential for invasive plant establishment and spread and water- and wind-driven soil erosion, and temporary visual impacts.

Contributions to cumulative effects on special status species would be greater for those species that are less tolerant of fragmented or disturbed habitats. While some general wildlife can inhabit relatively disturbed habitats and reoccupy temporarily disturbed and restored areas relatively quickly, some special status species, including kangaroo mice, may not have this ability. Temporarily disturbed suitable habitat, even if restored, can take a relatively long time to regain suitability, and this does not guarantee species reoccupation.

Finally, combined with past, present, and reasonably foreseeable future actions, Alternative A would increase the presence of infrastructure in the analysis area, including power lines, power plants, wells, and ancillary power generation infrastructure. The primary potential impacts associated with this are increased potential for wildlife injury or mortality due to strike, entrapment, or electrocution, though the potential for this would be reduced by incorporating design best practices for wildlife protection. Because there is existing electrical transmission infrastructure crossing the California NHT, the proposed gen-tie would not reduce the integrity of setting, feeling, and association of this resource. There would also be the potential for changes in the context and setting for special designation areas, visual resources, and recreation, though the potential would be reduced by incorporating visual design standards.

Based on the anticipated potential impacts from Alternative A, when combined with impacts from past, present, and reasonably foreseeable future actions in the cumulative effects analysis area, no cumulatively significant impacts are anticipated.

There would be no cumulative effects from Alternative B because the Project would not be constructed. Cumulative effects, as described above, may continue to occur in portions of the project area; this is because there is already geothermal production and powerline infrastructure in the project area.

Chapter 4. Consultation and Coordination

4.1 TRIBES, INDIVIDUALS, ORGANIZATIONS, AND AGENCIES CONSULTED

During the NEPA process for this EA, the BLM formally and informally consulted and coordinated with other federal agencies, state and local governments, Native American tribes, and the interested public. The agency did this to ensure its compliance, in both the spirit and intent, with 40 CFR 1501.7, 1502.19, and 1503. In addition to formal scoping, the BLM implemented collaborative outreach and a public involvement process that included inviting agencies to be cooperative partners for the EA planning process. A cooperating agency is any federal, state, or local government agency or Native American tribe that enters into formal agreement with the lead federal agency to help develop an environmental analysis.

4.1.1 Government-to-Government Consultation

The federal government works on a government-to-government basis with Native American tribes as they are recognized to be separate governments. This relationship was formally recognized on November 6, 2000, with Executive Order 13175 (Federal Register, Volume 65, page 67249). As a matter of practice, the BLM coordinates with all tribal governments, associated native communities, native organizations, and tribal individuals whose interests might be directly and substantially affected by activities on public lands. In addition, Section 106 of the NHPA requires federal agencies to consult with Native American tribes for undertakings on tribal lands and for historic properties of significance to the tribes that may be affected by an undertaking (36 CFR 800.2(c)(2)). BLM Manual 1780, Tribal Relations, and BLM Handbook H-1780-1, Improving and Sustaining BLM-Tribal Relations, provide guidance for Native American consultations.

Executive Order 13175 stipulates that, during the NEPA process, federal agencies consult tribes identified as being directly and substantially affected. The BLM notified several tribes of the Proposed Action in writing in May 2019. Letters were sent to the Pyramid Lake Paiute Tribe, Summit Lake Paiute Tribe, Reno-Sparks Indian Colony, and Susanville Rancheria. The BLM also held consultation and informational meetings to discuss the Proposed Action with the PLPT on January 7 and March 3, 2020. The PLPT expressed concerns regarding potential impacts on groundwater, surface water, and geothermal resources on their reservation.

4.1.2 Nevada State Historic Preservation Officer

In accordance with the requirements of Section 106 of the NHPA, the BLM is consulting with the Nevada State Historic Preservation Office.

4.1.3 US Department of the Interior, Fish and Wildlife Service

Consultation with the USFWS is required under Section 7(c) of the Endangered Species Act (ESA) before the BLM begins any project that may affect federally listed or endangered species or their habitat. Current surveys have indicated that ESA-listed species are not found in the project area. This indicates that a draft biological assessment would not be needed to evaluate the potential impact of the project on federally listed threatened and endangered species.

4.1.4 US Department of the Interior, National Park Service

The National Park Service is the administering agency for National Historic Trails. The BLM is coordinating with the National Park Service because the gen-tie alignment crosses the California Trail near its southern terminus near Fernley, Nevada.

4.1.5 Cooperating Agencies

Cooperating agencies are any federal, state, or local government agency or Native American tribe that enters into a formal agreement with the lead federal agency to help develop an environmental analysis. Cooperating agencies and tribes work with the BLM, sharing knowledge and resources, to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks. Agencies and tribal entities that were invited and those that accepted and signed a memorandum of understanding agreeing to participate as cooperating agencies for this NEPA process are presented in **Table 4-1**, below.

Table 4-1
Cooperating Agency Participation

Agencies and Tribes Invited to Be Cooperators	Invited	Accepted
Nevada Department of Wildlife	Yes	Yes
Nevada Sagebrush Ecosystem Technical Team	Yes	No
Pyramid Lake Paiute Tribe	Yes	Yes
US Fish and Wildlife Service	Yes	Yes
Washoe County	Yes	No

4.2 LIST OF PREPARERS

This environmental assessment was prepared by an interdisciplinary team of staff from the BLM and Environmental Management and Planning Solutions, Inc. (EMPSi), with their supporting subcontractors. The following is a list of people who prepared or contributed to the development of this EA.

4.2.1 US Department of the Interior, Bureau of Land Management

Team	Name	Role/Responsibility	Education
Management	Mark Hall	Field Office Manager, Native American Religious Concerns	PhD Anthropology MSE Mining and Metallurgy BSE Mining and Metallurgy MA Anthropology
	Tai Subia	Project Manager, Geology	MS Geological Sciences BS Geological Sciences
	Kathleen Rehberg	Assistant Field Office Manager, Minerals	BS Geology
	Andy Boerigter	Assistant Field Office Manager	BS Applied Geography
	Robin Michel	Planning and Environmental Coordinator	MA Anthropology

Team	Name	Role/Responsibility	Education
Interdisciplinary	Kathryn Ataman	Cultural Resources, National Conservation Area, National Historic Trails	PhD Prehistory MA Anthropology MA Near Eastern Archaeology BA Indiv. Conc. in Archaeology
	Angela Arbonies	Range, Wild Horses and Burros	BS Environmental and Natural Resource Science (Range and Forestry)
	Jean Black	Hydrology	BS Geology Certified Professional Geologist
	Kathleen Torrence (Cadigan)	Wildlife, Threatened and Endangered Species, Special Status Species, Migratory Birds	BS Wildlife Ecology BS Conservation and Biology
	Janet Hook	Project Support, Geology	BS Geology
	Michael Kizorek	Recreation	Recreation Specialist
	Andrew Laca	Soils	BS Agricultural Education AA Agriculture
	Gabrielle Lukins	Visual Resources	MS Applied Environmental Anthropology BA Anthropology
Interdisciplinary (continued)	Michael McCampbell	Invasive, Nonnative Species	MS Applied Ecology & Conservation Biology BA Biology
	Christine McCollum	Cultural Resources	Cultural Resources Specialist
	Julie McKinnon	Lands and Realty, Infrastructure	Realty Specialist
	Julie A. Suhr Pierce	Social values, environmental justice, economics	PhD Natural Resource, Environmental, and Public Economics
	Garret Swisher	Wild Horses and Burros	BS Rangeland Ecology and Management
	Tanner Whetstone	Native American Religious Concerns, Cultural Resources, National Historic Trails	BA Anthropology

4.2.2 Consultant: Environmental Management and Planning Solutions, Inc.

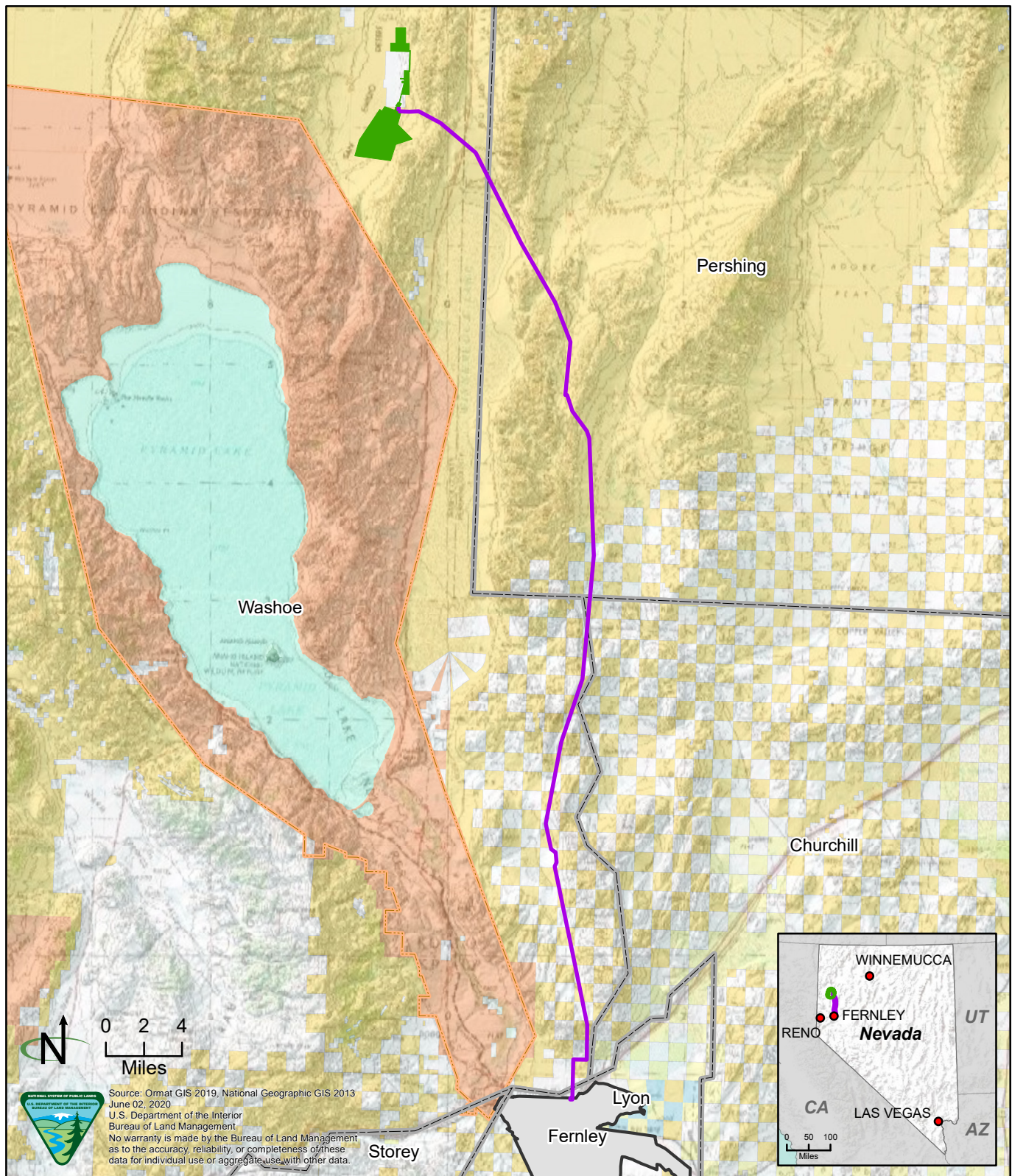
Team	Name	Role/Responsibility	Education
Core	Peter Gower	Project Manager	MS Land Use Planning BS Geography BA Political Science
	Morgan Trieger	Assistant Project Manager, Lead Biologist	BS Conservation and Resource Studies

Team	Name	Role/Responsibility	Education
ID Team and Support Staff	Alex Dierker	GIS Technician	BS Fisheries Sciences, GIS Advanced Certificate
	Jenna Jonker	GIS Lead	BA Geography
	Kirsti Settas	Geology and Hydrology	BS Environmental Science
	Cindy Schad	Word Processing	BFA Creative Writing
	Kim Murdock	Technical Editor	MBA in Management Information Systems (MIS) and Marketing BS in Marketing and Entrepreneurship
	Randolph Varney	Technical Editor	MFA Writing BA Technical and Professional Writing

Appendix A

Figures

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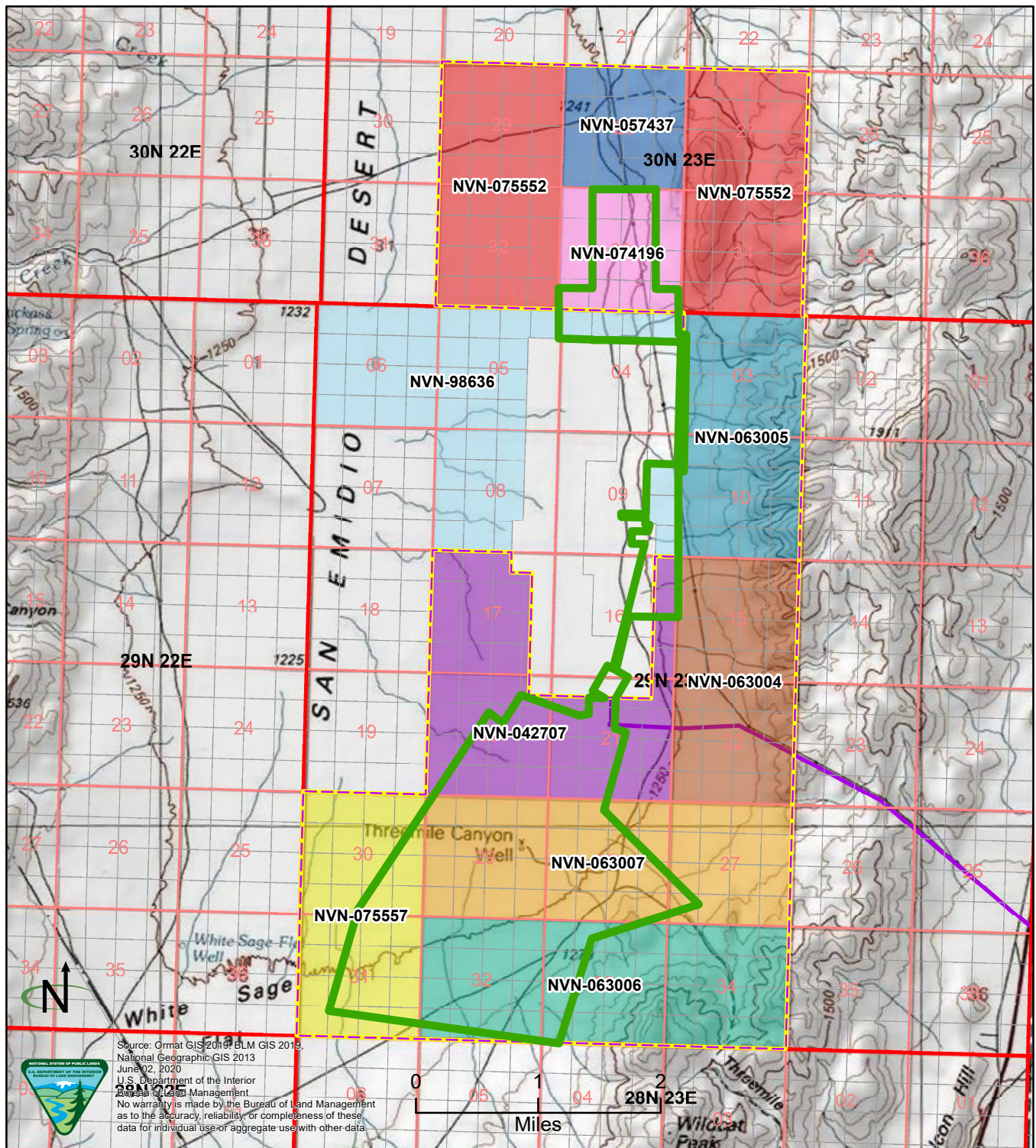
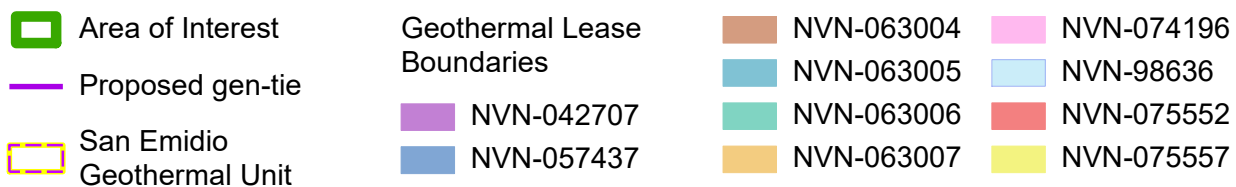


Figure A-2: Geothermal Lease Areas



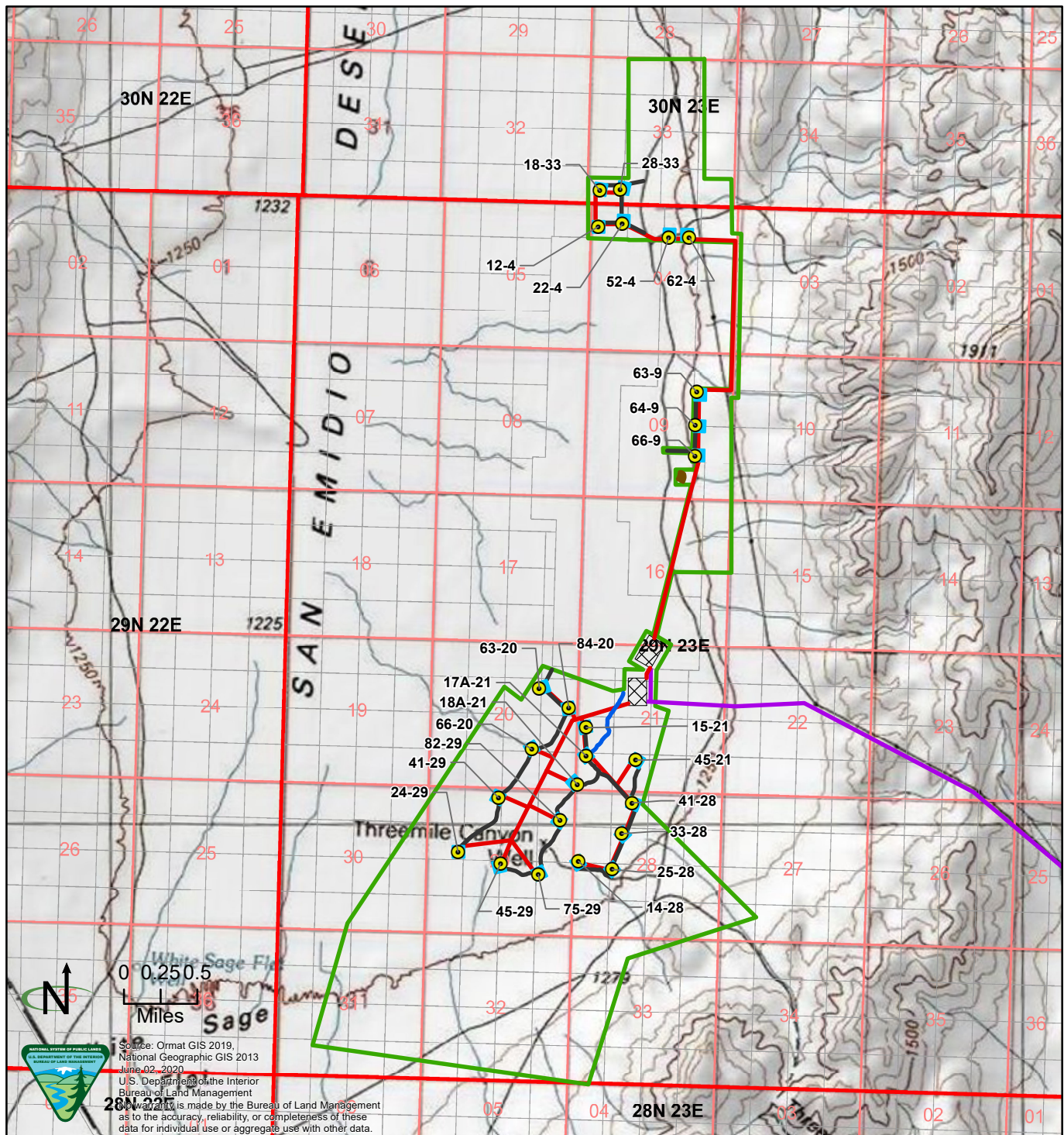


Figure A-3. Project Overview—San Emidio Geothermal Lease Unit

- | | |
|--|---|
| Area of Interest | — Pipeline |
| — Proposed gen-tie | — Road- improve |
| X X X X Power plant | — Road- new |
| ● Well | |
| Well pad | |
| Aggregate pit | |

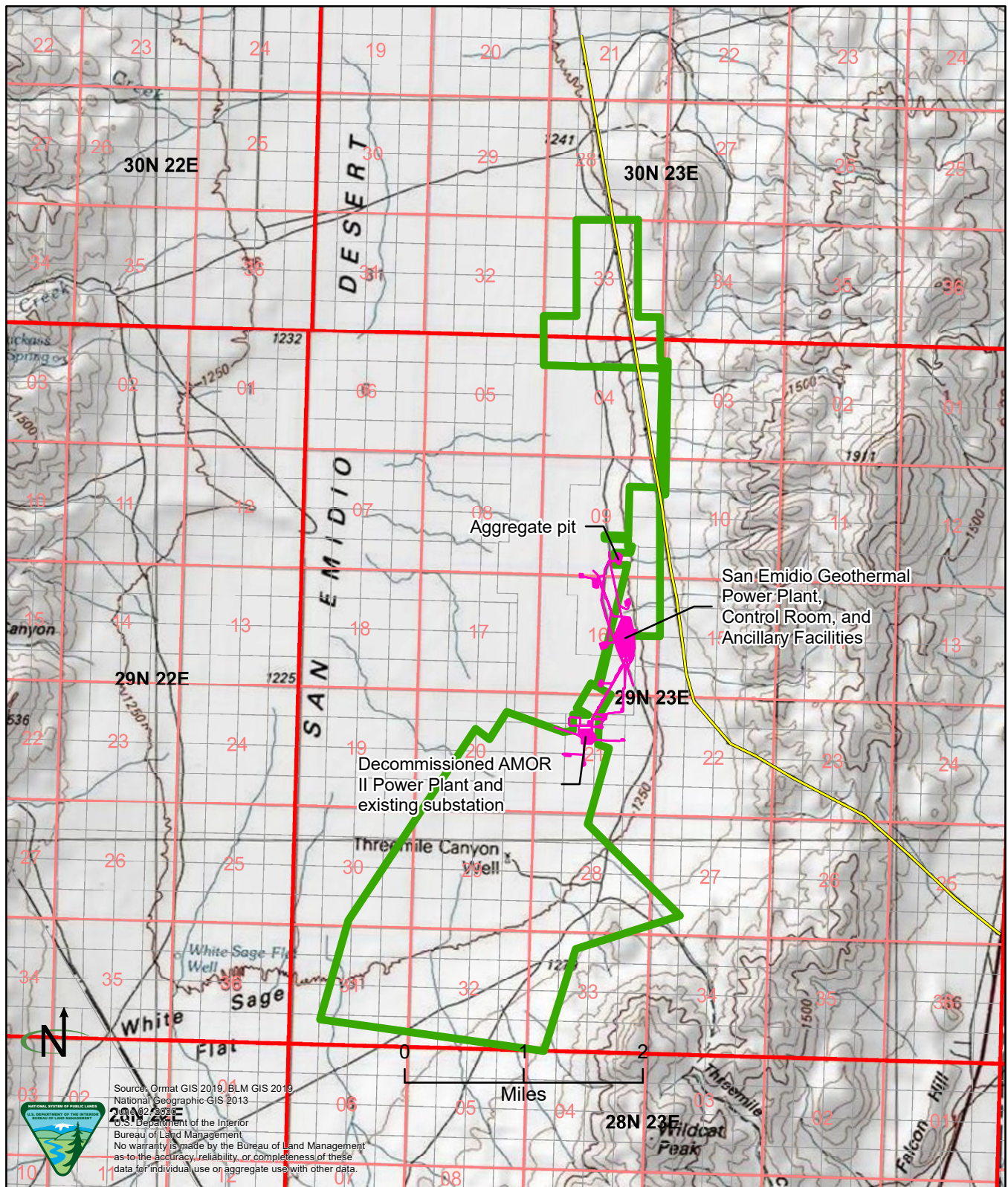


Figure A-4.
Existing Geothermal Utilization and Electrical Transmission Facilities

- Area of Interest
- Existing disturbance
- LADWP 500 kV transmission line

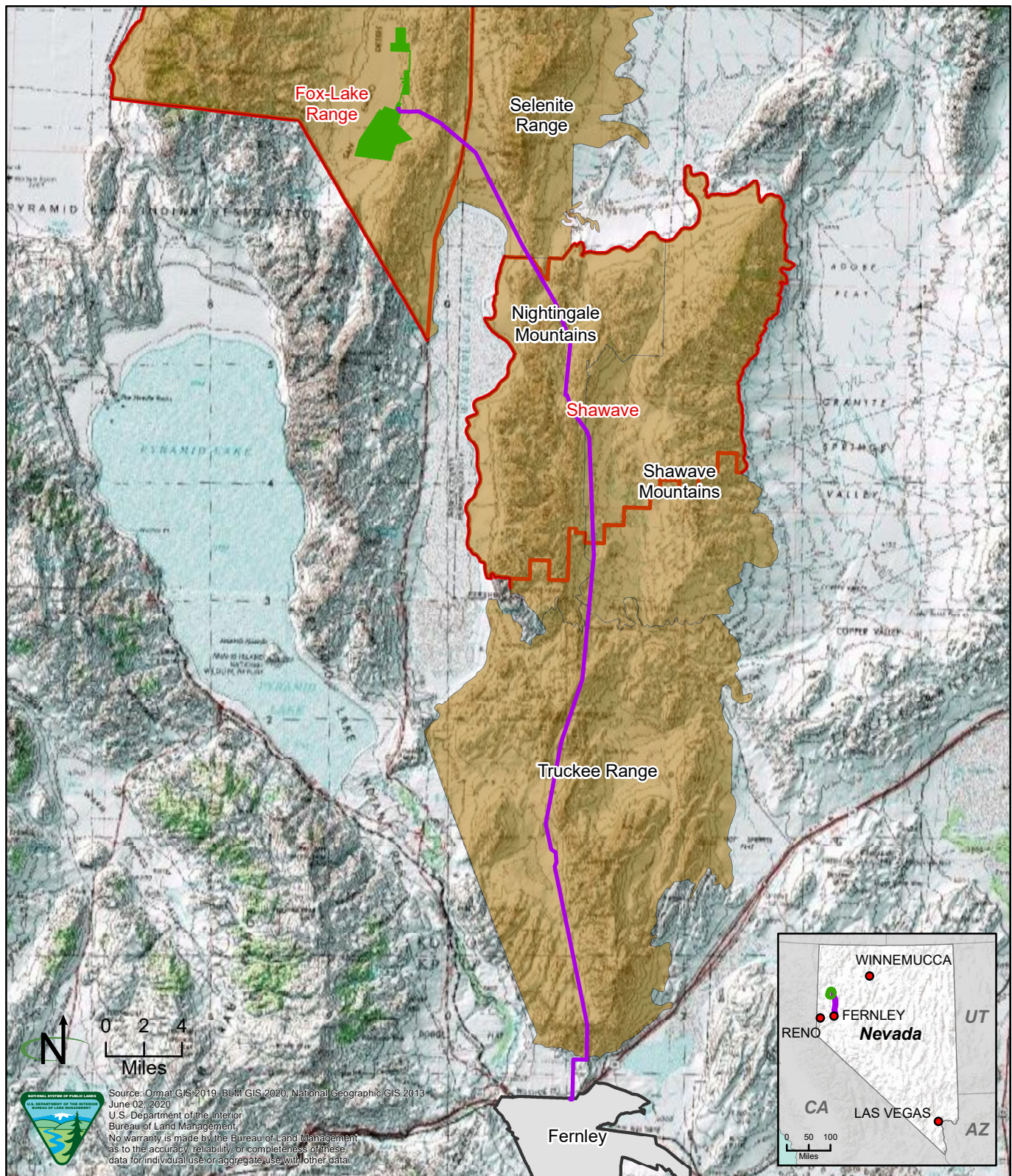


Figure A-5. Wild Horses and Burros Herd Areas and Herd Management Areas

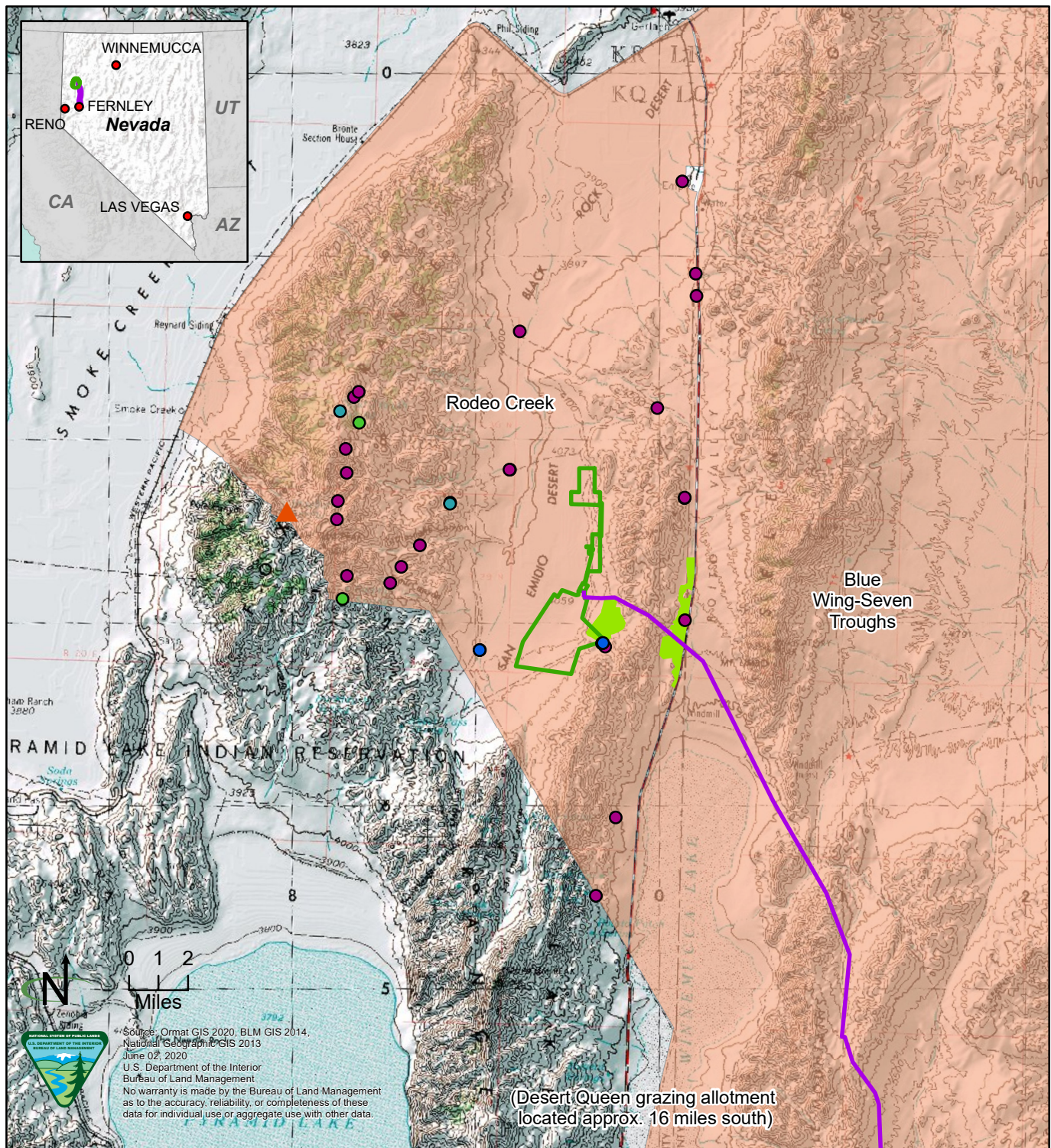


Figure A-6. Range Improvements

- | | |
|-------------------|---------------|
| Area of Interest | Cabin |
| Proposed gen-tie | Spring |
| Grazing allotment | Spring/trough |
| Seeded area | Trough |
| | Well |

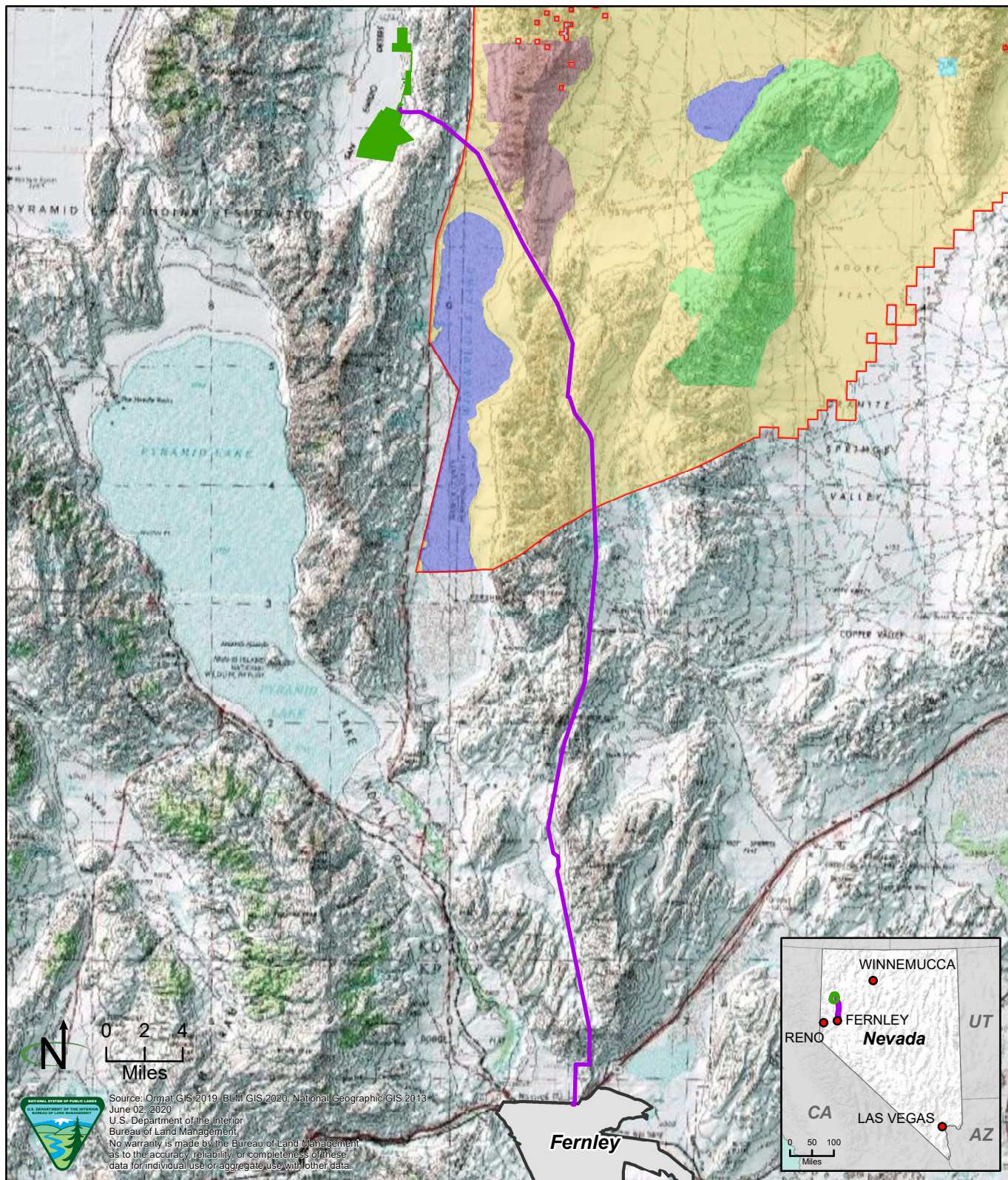


Figure A-7. Nightingale Special Recreation Management Area

- | | |
|------------------|--------|
| Proposed gen-tie | Zone 1 |
| Area of Interest | Zone 2 |
| Nightingale SRMA | Zone 3 |
| | Zone 4 |
| | Zone 5 |

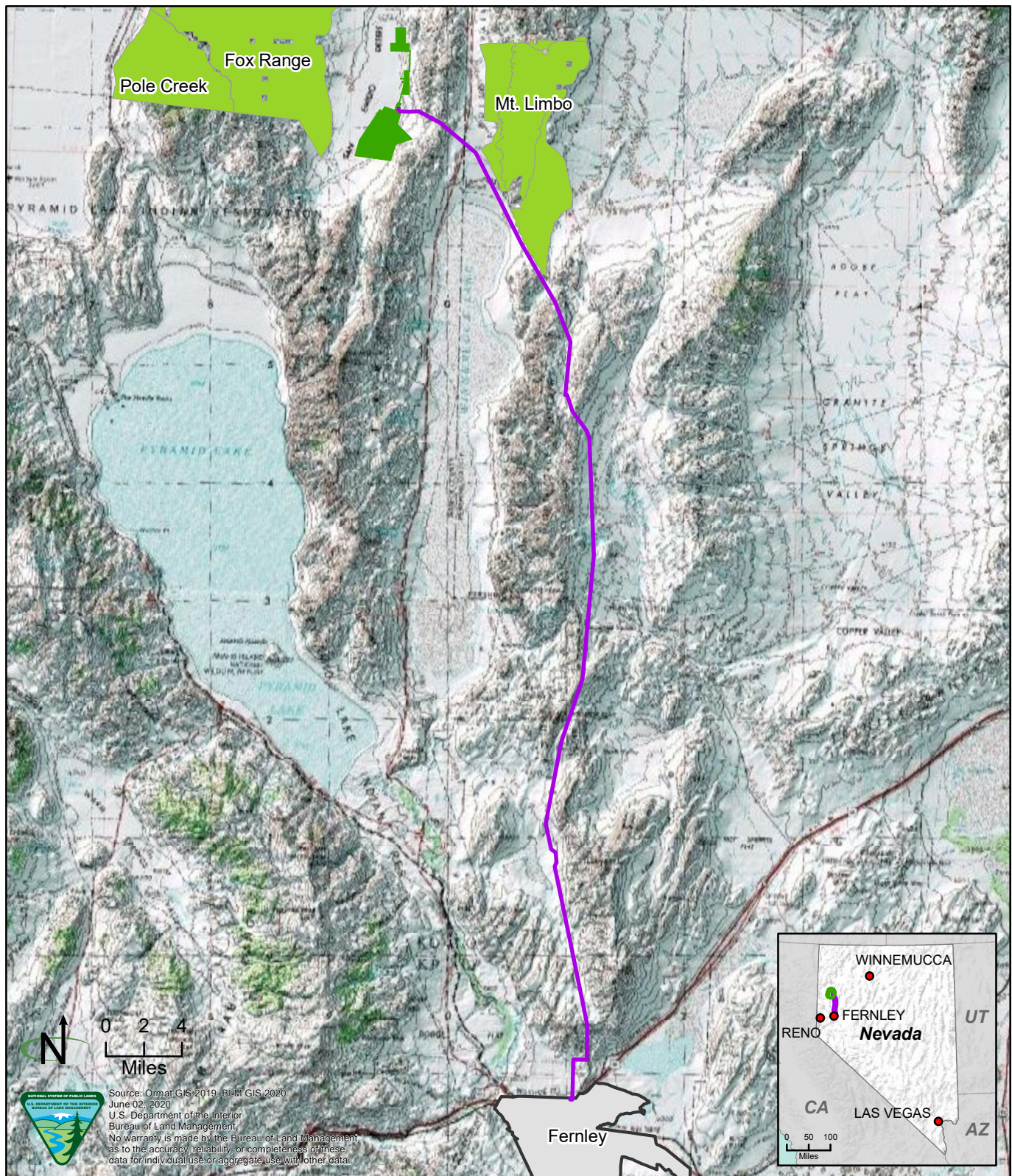


Figure A-8. Wilderness Study Areas

- Proposed gen-tie
- Wilderness study area
- Area of Interest

Appendix B

Environmental Contingency Plans

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Appendix B. Environmental Contingency Plans⁹

Fire Contingency Plan

1. Any small fires that occur around the well pad during drilling and/or testing operations should be able to be controlled by rig personnel utilizing on-site firefighting equipment.
2. The BLM Winnemucca District Office (775.623.1500) would be notified of any wildland fire, even if the available personnel can handle the situation or the fire poses no threat to the surrounding area. Additionally, the Sierra Front Interagency Dispatch Center would be notified at 775.883.5995.
3. A roster of emergency phone numbers would be available on-site so that the appropriate firefighting agency can be contacted in case of a fire.
4. All vehicles shall carry at a minimum a shovel and five gallons of water (preferably in a backpack pump), in addition to a conventional fire extinguisher.
5. Adequate firefighting equipment (a shovel, a pulaski, standard fire extinguisher(s), and an ample water supply) shall be kept readily available at each active drill site.
6. Vehicle catalytic converters (on vehicles that would enter and leave the drill site on a regular basis) shall be inspected often and cleaned of all flammable debris.
7. All cutting/welding torch use, electric-arc welding, and grinding operations shall be conducted in an area free, or mostly free, of vegetation. An ample water supply and shovel shall be on hand to extinguish any fires created from sparks. At least one person in addition to the cutter/welder/grinder shall be at the work site to promptly detect fires created by sparks.
8. Personnel would be responsible for being aware of and complying with the requirements of any fire restrictions or closures issued by the BLM Winnemucca District Office, as publicized in the local media or posted at various sites throughout the field office district.

Spill or Discharge Contingency Plan

I. Potential Sources of Accidental Spills or Discharges

a. Geothermal Fluid

Accidental discharges or spills could result from any of the following:

⁹ Ormat (Ormat Nevada, Inc.). 2020. Utilization Plan—North Valley Geothermal Development Project, Washoe, Pershing, Churchill, and Lyon Counties, Nevada. Reno, Nevada.

- (1) Loss of well control (blowout);
- (2) Pipeline leak or rupture; or
- (3) Leakage from test tank.

b. Drilling Muds

Muds are a mixture of water, non-toxic chemicals and solid particles used in the drilling operations to lubricate and cool the bit in the hole, to carry cuttings out of the hole, to maintain the hole condition, and to control formation pressure. Drilling muds are prepared and stored in metal tanks at the drilling site. Waste drilling mud and cuttings are discharged into the reserve pit, which is open and is adequately sized to hold the volume necessary for the operation. Accidental discharges of drilling mud could occur by:

- (1) overflow of the reserve pit;
- (2) reserve pit wall seepage or wall failure;
- (3) discharge from equipment failure on location; or
- (4) shallow lost circulation channeling to the surface.

c. Lubricating or Fuel Oils and Petroleum Products

To minimize the potential for spills, all petroleum products on site are labeled, stored, and handled in conformance with applicable federal and state requirements. All materials except diesel fuel are stored in the original shipping containers. Diesel fuel is stored in on-board tanks on the drill rig and replenished from a bulk tank truck using an electric transfer pump and hard lines. Large 500-gallon storage tanks at the power plant would include a secondary containment system that would accommodate a design criterion of 110% volume of the largest tank requiring containment, per 40 CFR 112. Further, Supervisors trained in spill prevention, containment, and clean-up are onsite 24 hours a day. Potential locations for accidental spills are:

- (1) drilling equipment and machinery at and around the drilling location;
- (2) other miscellaneous equipment and machinery at well site and roads;
- (3) storage areas; and
- (4) equipment servicing areas.

d. Construction/Maintenance Debris

Trash shall be contained onsite and hauled to an approved landfill. Burial of trash on-site shall not be permitted.

2. Plan for Cleanup and Abatement

In the event of discharge of formation fluids, drilling muds, or petroleum products, the person responsible for the operation would make an immediate investigation, then contact the Drilling Supervisor and advise him of the spill. The Drilling Supervisor would in turn call out equipment, regulate field operations, or do other work as applicable for control and cleanup of the spill, as follows:

a. Action—Small, Containable Spill

If the spill is small (i.e., less than 25 gallons) and easily containable without endangering the watershed, the Drilling Supervisor would direct and supervise complete cleanup and return to normal operations.

b. Action—Large or Uncontainable Spill

If the spill is larger than 25 gallons, or is not easily contained, or endangers, or has entered, the watershed, the Drilling Supervisor would proceed to take necessary action to curtail, contain, and clean up the spill, as above, and notify personnel as listed below.

c. Notification

(1) The Drilling Supervisor would, as quickly as practicable:

- Call out contractor(s), as required.
- Notify the Ormat Project Manager.
- Notify the local and state law enforcement agencies if the public safety is threatened.

(2) The Ormat Project Manager would notify the following as soon as practical and work closely with them in all phases of the curtailment, containment, and cleanup operations:

Nevada Division of Minerals (NDOM)
State of Nevada
400 W. King
Carson City, NV 89703
775.684.7040

Nevada Division of Environmental Protection (NDEP)
Division of Emergency Management
775.688.2830 or 888.331.6337
901 S. Stewart Street
Carson City, NV 89706

BLM Winnemucca District Office
(within 24 hours of the knowledge of a reportable release)
5100 E. Winnemucca Blvd.
Winnemucca, NV 89445
775.623.1500

National Response Center
800.424.8802

The Drilling Supervisor would also advise local population and affected property owners if spill affects residents or property.

d. Specific Procedures

(1) For geothermal fluid spills:

- Contain spillage with dikes if possible and haul to disposal site by vacuum or water trucks or dispose of in a manner acceptable to the NDOM and BLM.

(2) For drilling mud:

- Repair reserve pit or contain with dikes. Haul liquid to another reserve pit, available tanks, or approved disposal site.

(3) For petroleum products:

- Contain spill with available manpower. Use absorbents and dispose of same in approved disposal area.
- Spills of petroleum products in excess of 25 gallons must be reported to the NDEP as soon as possible, but no later than the end of the first working day of the release at:
 - In-state: 888.331.6337
 - Out of state: 775.687.9485

For (1) through (3) above, Ormat would have the source of the spill repaired at the earliest practical time, and continue working crews and equipment on cleanup until all concerned agencies are satisfied.

e. Confirm telephone notification to agencies and regulatory bodies. Telephone notification shall be confirmed by the Ormat Project Manager in writing within two weeks of telephone notification. Written confirmation would contain:

(1) Reason for the discharge or spillage.

(2) Duration and volume of discharge or spillage.

(3) Steps taken to correct problem.

(4) Steps taken to prevent recurrence of problem.

Appendix C

References

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Appendix D

Draft Eagle Act Compliance Plan

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DRAFT – USFWS/ORMAT TO FINALIZE



EAGLE ACT COMPLIANCE MEASURES

NORTH VALLEY GEOTHERMAL DEVELOPMENT PROJECT AT SAN EMIDIO



Prepared by:

Ormat Nevada, Inc.
6140 Plumas St.
Reno, Nevada 89519

Submitted to:

United States Fish and Wildlife Service
Pacific Southwest Region

May 2020

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1.0 INTRODUCTION

ORNI 36 LLC, a subsidiary of Ormat Nevada, Inc. and herein referred to as “Ormat,” is proposing to construct, operate, and maintain the North Valley Geothermal Development Project (Project). The Project would include the construction and operation of up to two energy generation facilities, geothermal fluid production and injection wells and well pads, access roads, geothermal fluid pipelines, an electrical transmission line and ancillary support facilities. The Project is located in Washoe, Pershing, Churchill, and Lyon Counties, Nevada (Figure 1).

The Project is located within the San Emidio Geothermal Unit (NVN-85820X), which comprises both public and privately leased lands. The unit covers federal geothermal leases NVN-42707, NVN-63004, NVN-63005, NVN-63006, NVN-63007, NVN-74196, NVN-75552, NVN-75557, and NVN-98636. The San Emidio Unit area encompasses approximately 20,407.12 acres of public and private lands in all or portions of Sections 19-22 and 27-34, Township 30 North, Range 23 East (T30N, R23E), Sections 3-10, 15-22, and 27-34, Township 29 North, Range 23 East (T29N, R23E), Mount Diablo Baseline and Meridian (MDB&M).

During baseline studies, multiple golden eagle nests were located within 1 mile of the proposed geothermal facilities and the proposed transmission line. The purpose of this document is to demonstrate Ormat’s commitment to avoid all “take” to these nests during construction activities during the breeding season. No direct “take” to nests sites will occur, these measures are to avoid any disturbance “take.” In addition, Ormat has volunteered additional measures to support the golden eagle population within the region of the project.

2.0 PROPOSED OPERATIONS

2.1 PROPOSED FACILITIES

Geothermal Power Plant

The North Valley energy plants would each be approximately 20 MW net rated (24MW gross) binary design geothermal energy generation facilities. The proposed energy plants would each be located on approximately 15 acres within Sections 16 and 21, T29N, R23E. An approximately 0.50-acre substation, used to transform generated low voltage electrical energy to the higher voltage required for a transmission line, would be constructed within the northern energy plant boundary, or the existing substation from the decommissioned AMOR II Geothermal Power Plant would be expanded and utilized for the southern energy plant boundary, depending on which energy plant is constructed first (Figure 2).

Well Field

Ormat is proposing 25 production and injection wells, all located within the San Emidio Unit on public lands managed by the BLM (Figure 2).

Figure 1 – Project Location

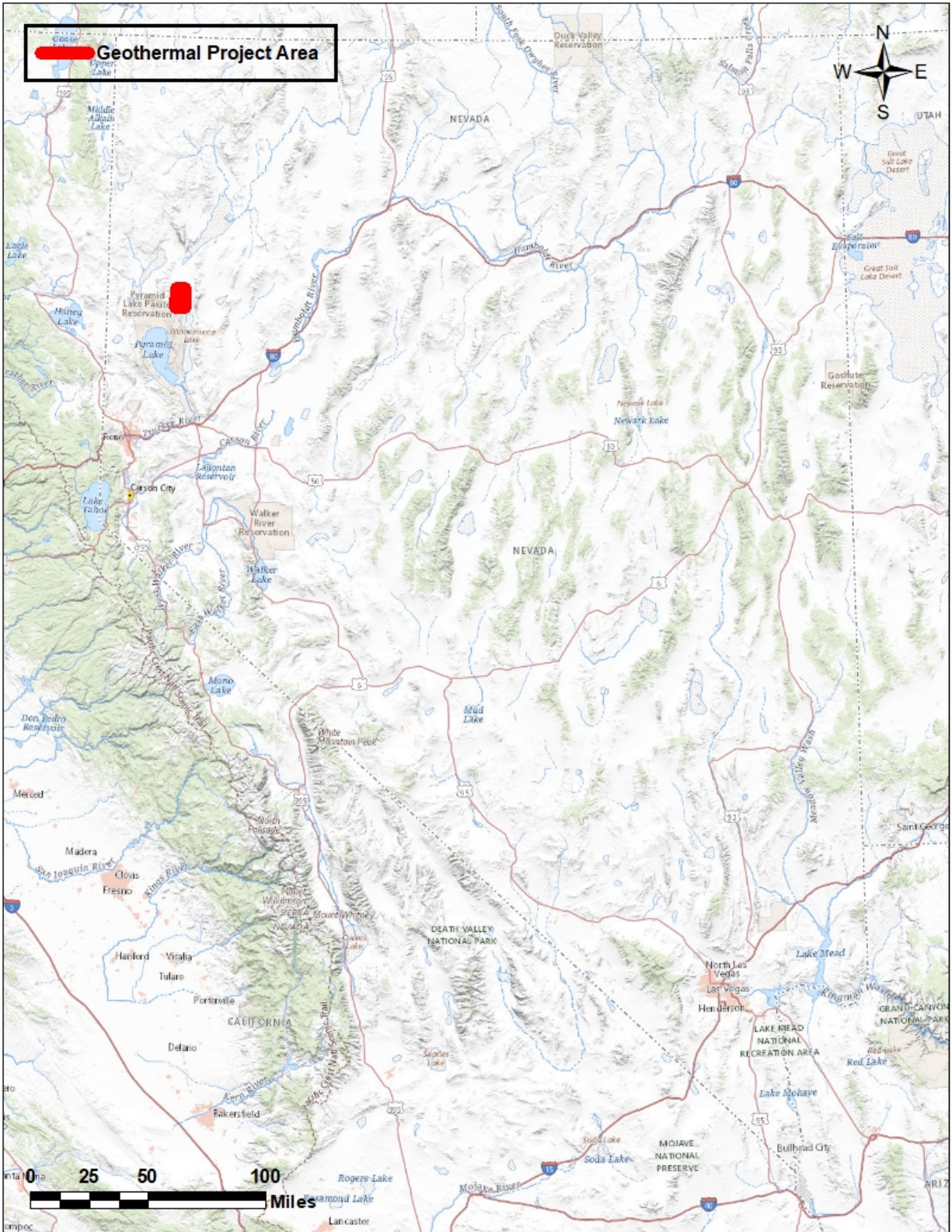
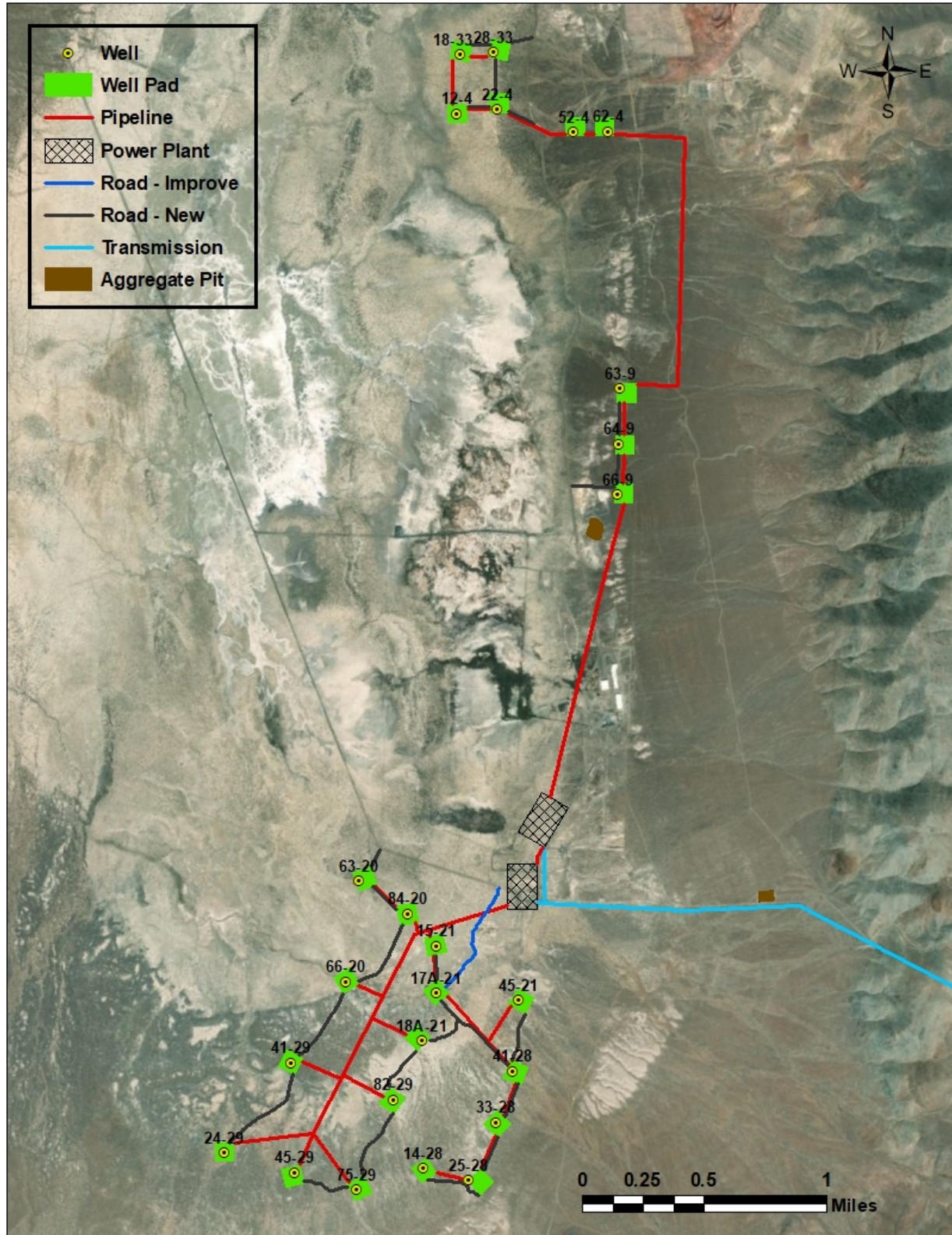


Figure 2 – Geothermal Project Layout



Transmission Line

The transmission will originate at the proposed power plant substation at the geothermal facility and travel south approximately 57.7 miles running generally parallel to the LADWP 400kV DC Line, at which point the line will continue west approximately 0.8 miles running parallel to the NVE #118 120kV Line, at which point the line will continue south approximately 2.0 miles again running parallel to the NVE #118 120kV Line before terminating at the existing Eagle Substation Portal (39d37'17.669"N, 119d12'32.762"W) (Figures 3-5).

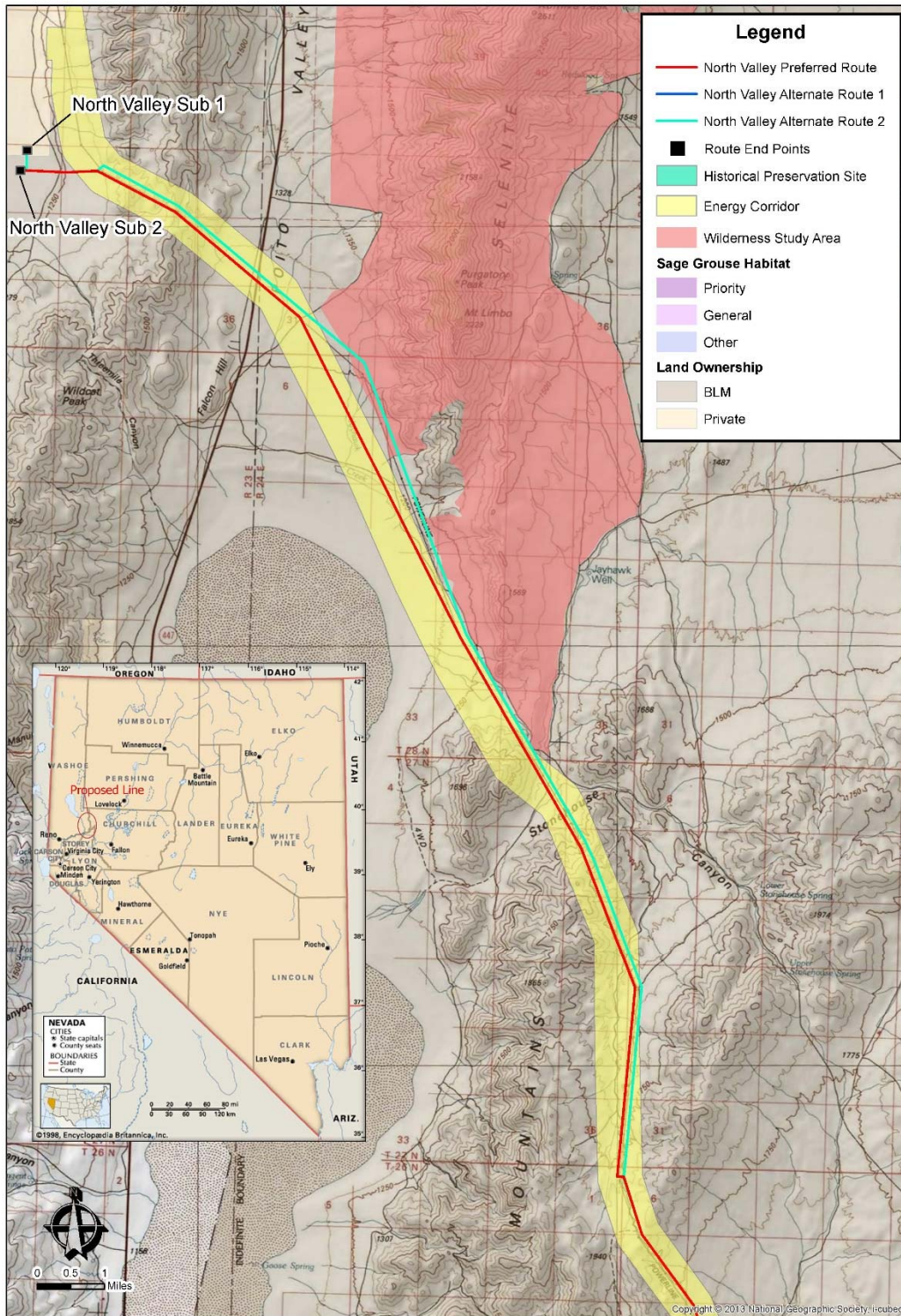
The gen-tie will consist of a single 120-kV circuit on direct-buried wood h-frame structures. Typical structure heights and average span lengths are detailed in Table 2 below. The wood h-frames will be used for all tangent configurations. Guyed wood h-frame and 3-pole configurations will be used for in-line dead-end applications and guyed wood 3-pole configurations will be used for all angle applications. All structures will be assembled and insulators will be attached to the pole. The poles will be erected with a truck-mounted crane to lift and set the structure after it is assembled. Structure sites will include assembly and crane-landing areas.



A summary of the gen-tie is provided below:

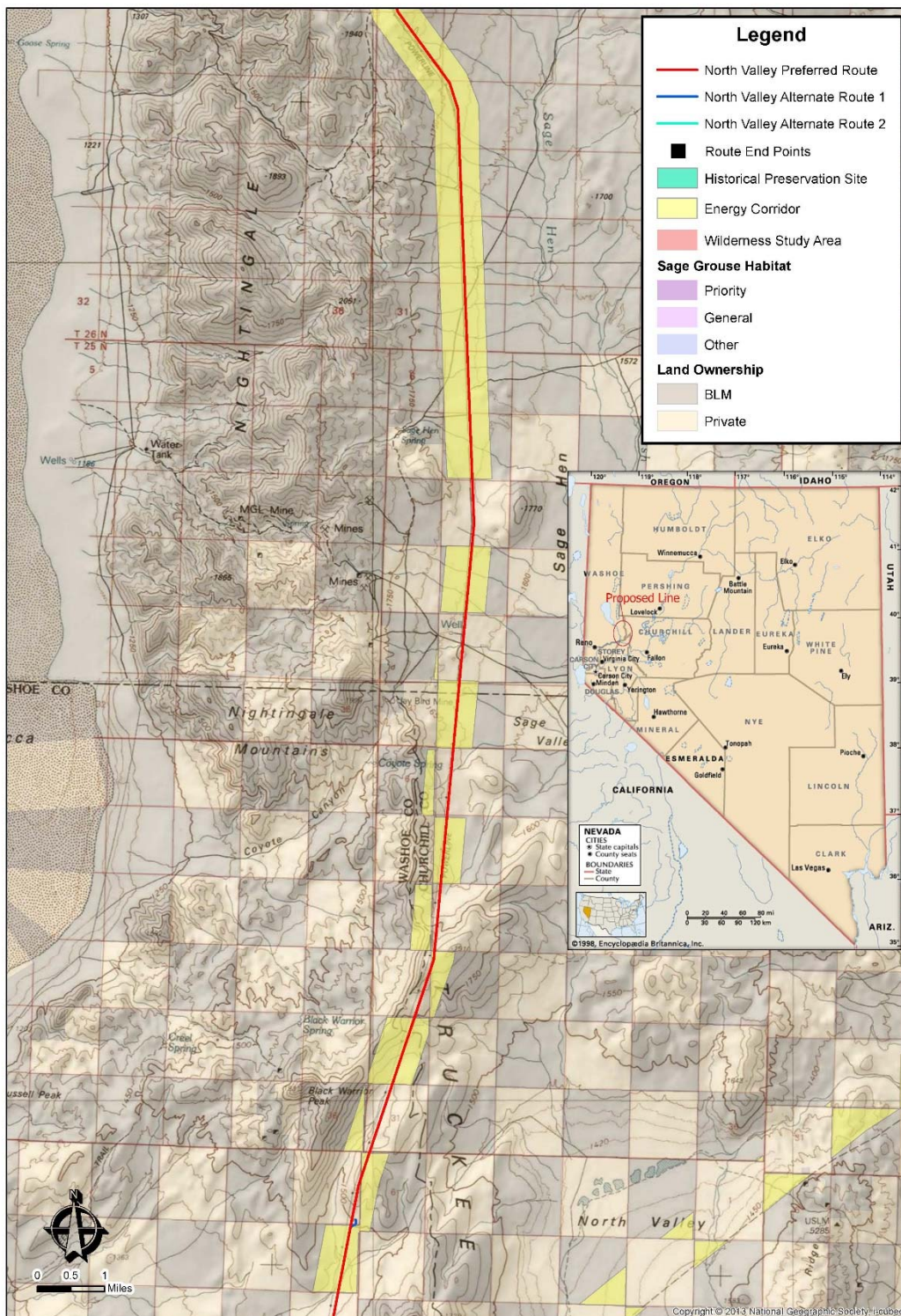
Line Length	57.7 miles
Type of Pole Structures	Wood H-Frame, direct embedded
Structure Height	52 to 79 feet (AGL); 60 to 90 feet (Pole Length)
Structure Base Diameter	1.5 to 2.0 feet
Average Span Length	960 feet (100' minimum to 2000' maximum)
Number of Structures/Mile	5.5
Right-of-Way Width	300-foot-wide ROW (a 100-foot permanent ROW with an extra 200-foot temporary ROW for construction), plus an additional 50 feet (100 foot radius) on the guy wire side of the outermost line angle pole for anchor easements (see Figure 4).
Voltage	120 kV
Conductor Size	397.5 MCM 19 Strand non specular ACSR "Ibis" cable
Shield Wire Size	3/8" EHS Steel
OPGW Size	~0.5" Diameter (12 to 48 Fiber)
Ground Clearance of Conductor	Minimum 21 feet above the ground line



In order to establish work areas where poles and conductors would be installed, vegetation clearing and grading within the ROW could be necessary. In all locations, Ormat would utilize overland travel to the extent possible and vegetation removal would be minimized to the maximum extent possible. In order to stage equipment and conduct work, the structure access and work areas and the stringing sites would require a relatively flat surface; therefore, the areas could be graded and gravel or soil could be imported to achieve the necessary elevation. Any aggregate would be obtained from within the boundaries of an existing lease, an existing aggregate pit, or from a private source located near the project area.

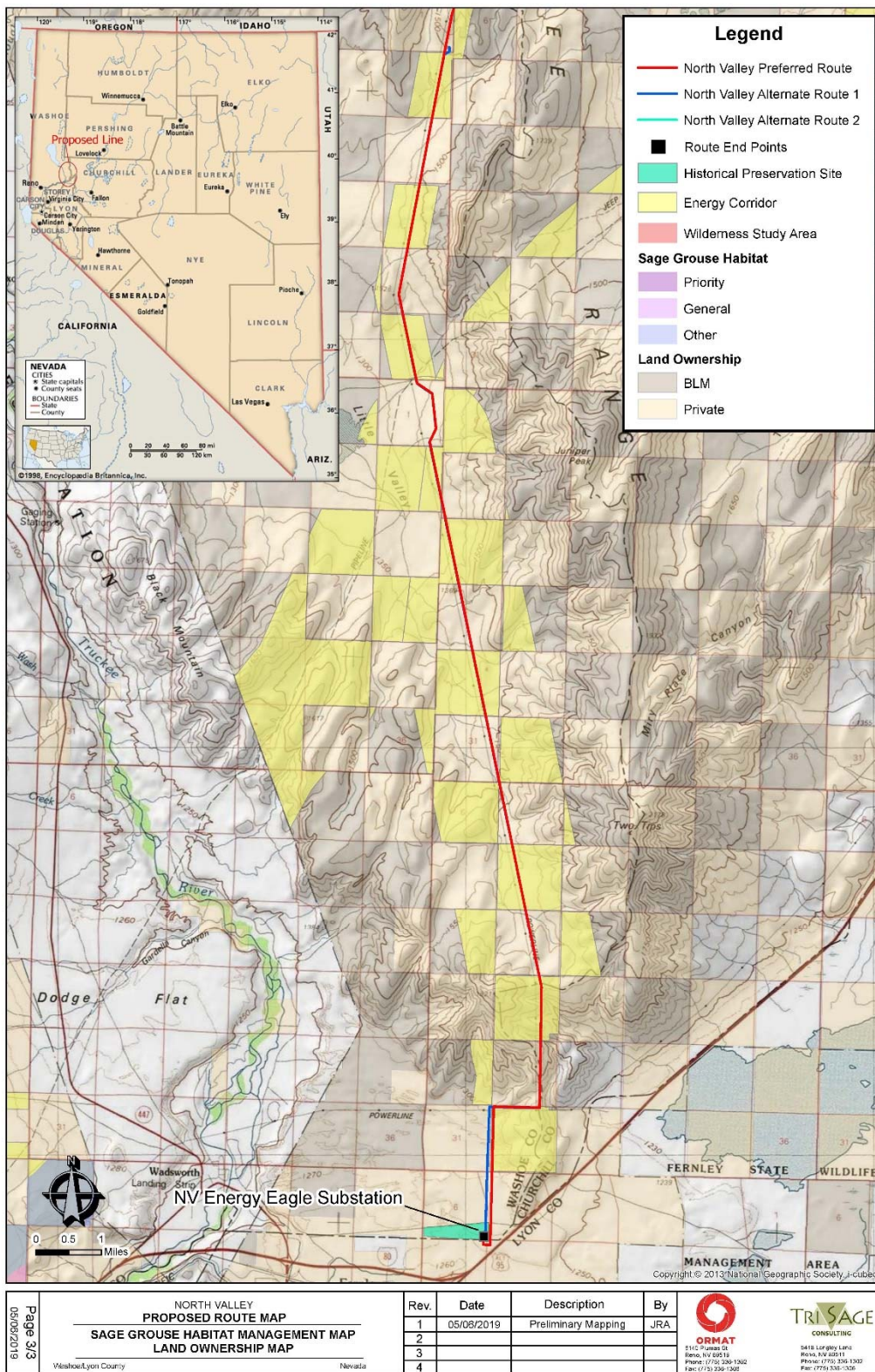
Figure 3-5 – Transmission Line Route



Page 1/3 05/06/2019	NORTH VALLEY PROPOSED ROUTE MAP SAGE GROUSE HABITAT MANAGEMENT MAP LAND OWNERSHIP MAP			Rev.	Date	Description	By	 ORMAT 6140 Highway 10 Reno, NV 89515 Phone: (775) 336-1322 Fax: (775) 336-1320	 TRI SAGE CONSULTING 5418 Longley Lane Reno, NV 89511 Phone: (775) 336-1300 Fax: (775) 336-1300
				1	05/06/2019	Preliminary Mapping	JRA		
				2					
				3					
				4					



Page 2/3 05/06/2019	NORTH VALLEY PROPOSED ROUTE MAP				 DRMAT 5140 Thomas St. Reno, NV 89512 Phone: (775) 336-1202 Fax: (775) 336-1300	 TRISAGE CONSULTING 5410 Longley Lane Reno, NV 89511 Phone: (775) 336-1300 Fax: (775) 336-1300
	SAGE GROUSE HABITAT MANAGEMENT MAP					
	LAND OWNERSHIP MAP					
	Washoe County Nevada					
Rev.	Date	Description	By			
1	05/08/2019	Preliminary Mapping	JRA			
2						
3						
4						



After construction is complete, all existing roads would be left in a condition equal to or better than their preconstruction condition, as directed by the BLM and as applicable. Additionally, all other areas disturbed by construction activities would be recontoured, decompacted, and seeded. BLM-approved seed mixes would be applied to these disturbed areas. Ormat would attempt to close or restrict vehicle access to areas that have been seeded until the reclamation success criteria have been achieved.

3.0 REGULATORY FRAMEWORK

3.1 BALD AND GOLDEN EAGLE PROTECTION ACT

The BGEPA of 1940, as amended, prohibits the "take" or possession of bald and golden eagles with limited exceptions. Take, as defined in the BGEPA, includes, "to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." Disturb means, "to agitate or bother a bald or golden eagle to a degree that causes or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding or sheltering behavior."

Under the BGEPA, the USFWS may issue a permit that "authorizes take of bald and golden eagles where the take is compatible with the preservation of the bald eagle and golden eagle; necessary to protect an interest in a particular locality; associated with but not the purpose of the activity; and (1) [f]or individual instances of take: take that cannot practicably be avoided; or (2) [f]or programmatic take" where as "the take is unavoidable even through advanced conservation practices are being implemented"." (50 CFR 22.27)

3.2 MIGRATORY BIRD TREATY ACT

The Migratory Bird Treaty Act (16 United States Code 703-712) is administered by the USFWS and is the cornerstone of migratory bird conservation and protection in the US. The Migratory Bird Treaty Act implements a series of international treaties that provide for migratory bird protection. The Act authorizes the Secretary of the Interior to regulate the taking of migratory birds. The Act provides that it shall be unlawful, except as permitted by regulations, "to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird" (16 United States Code 703); but the Act does not regulate habitat. The list of species protected by the Act was revised in March 2010, and includes almost all bird species (1,007 species) that are native to the US.

3.3 EXECUTIVE ORDER 13186

Signed on January 11, 2001, this Executive Order directs each federal agency taking actions that are likely to have a measureable effect on migratory bird populations to develop and implement a Memorandum of Understanding with the USFWS that promotes the conservation of migratory

bird populations. The USFWS' Memorandum of Understanding with the BLM states, in part, that both parties shall, as practicable, protect, restore, and conserve habitat of migratory birds; follow the USFWS Bald Eagle Management Guidelines; follow other migratory bird conservation measures as appropriate and consistent with agency missions; work collaboratively to identify and address issues that affect species of concern; promote and contribute migratory bird population and habitat data to interagency partnership databases (BLM, 2010). The Memorandum of Understanding also commits the BLM to, among other measures, participate in planning efforts of Bird Conservation Regions and, at the project level, evaluate the effects of the BLM's actions on migratory birds during the National Environment Policy Act process (BLM, 2010).

4.0 SUMMARY OF BASELINE SURVEY RESULTS

Golden eagle occupancy surveys of the San Emidio Geothermal Unit and northern portion of the proposed transmission line alignment were conducted in April, May, and August 2019. The golden eagle survey area was developed in consultation with the BLM and USFWS. The results included the documentation of 38 golden eagle nests. Based on further analysis of the survey results, 6 nests were identified within a 1-mile radius of the proposed project disturbance area (transmission line and geothermal plant area), as show in Figure 6.

Figure 6 – Golden Eagle Nests located within 1-mile viewshed of Project Activities

This figure contains sensitive information and cannot be displayed without the consent of the BLM WDO and/or NDOW.

5.0 EAGLE ACT COMPLIANCE MEASURES

Ormat has committed to not only the following measures to comply with the Eagle Act, but is also voluntarily implementing measures to support golden eagle habitat and populations within the region:

5.1 PRE-CONSTRUCTION SURVEYS

- Efforts will be made to conduct new surface disturbance and construction outside of the golden eagle breeding season (Jan. 1-Aug.31).
- Ormat will coordinate with the USFWS and the NDOW on breeding season timing dependent on annual climatic conditions.
- If construction, drilling, or disturbance is required during breeding season, a pre-disturbance survey for nesting golden eagles will be conducted if project activities are

planned during the breeding season (Jan. 1 – Aug. 31) and within 1-mile of the disturbance footprint.

- The surveys will be conducted surveys within 14 days of the commencement of project activities.
- The surveys will be performed by a qualified biologist, ideally with at least two seasons of experience conducting nesting raptor surveys.
- If an active nest is detected, a qualified biologist will document the following information, if it is possible to do so without disturbing the eagles, to aid in USFWS coordination and project timing:
 - Nest location
 - Nest elevation
 - Species and age class of eagles observed
 - Photographs
 - Estimate of nest stage and date clutch completed
 - Number of young if present
 - Survey results should be documented in an internal memo and kept on file for the duration of the project.
- During herbicide treatments, a pre-application sweep of the area would be completed (i.e., looking for nesting birds). Any areas that become infested with weeds during construction would be mapped and treated.

5.2 PROJECT DESIGN FEATURES

- The project design and construction will minimize surface disturbance to the smallest area necessary to meet project needs and utilize existing disturbed areas when feasible.
- The transmission line will be constructed in compliance with Avian Powerline Interaction Committee (APLIC) standards.

5.3 HABITAT PROTECTION

- All project activities and facilities will not directly impact identified golden eagle nests. Facilities will avoid direct take.
- The project disturbance will not impact surface water features.
- To prevent the spread of invasive, non-native species, all contractors will be required to power-wash their vehicles and equipment, including body and undercarriage, prior to entering BLM-administered lands.
- All gravel and/or fill material will be certified as weed-free.
- Existing weed infestations would be treated prior to disturbance. The location of the weeds would be communicated to the Humboldt River Field Office weed coordinator,

and treatment methods and herbicides used would be discussed prior to treatment. Infestations would be either avoided or treated prior to disturbance.

5.4 HABITAT ENHANCEMENT

- If rocks are removed from project areas during grading, they will be collected and placed in piles outside of 1-mile of project activities.
- Previously altered habitat not needed for project operations will be restored currently or within 1-year of initial disturbance if feasible.

5.5 CONSTRUCTION TIMING

- No construction of facilities, drilling, or surface disturbance will occur within 1-mile of an identified active nest and within visibility of project activities.
- Construction of the transmission line will be built in segments if necessary to avoid activities within 1-mile of an active nest during breeding season.

5.6 CARCASS REMOVAL PROGRAM

- To reduce the occurrence of collisions between project vehicles golden eagles, roadkill (non-protected species) will be removed from project access roads.
- This program will be coordinated with appropriate wildlife agencies to acquire permits and authorizations if required.

5.7 EAGLE TAKE PERMIT CONTINGENCY

- If it becomes inevitable to avoid any indirect disturbance “take” to meet construction timelines for active nests during breeding season, Ormat will apply for a take permit from the USFWS, subject to additional NEPA.

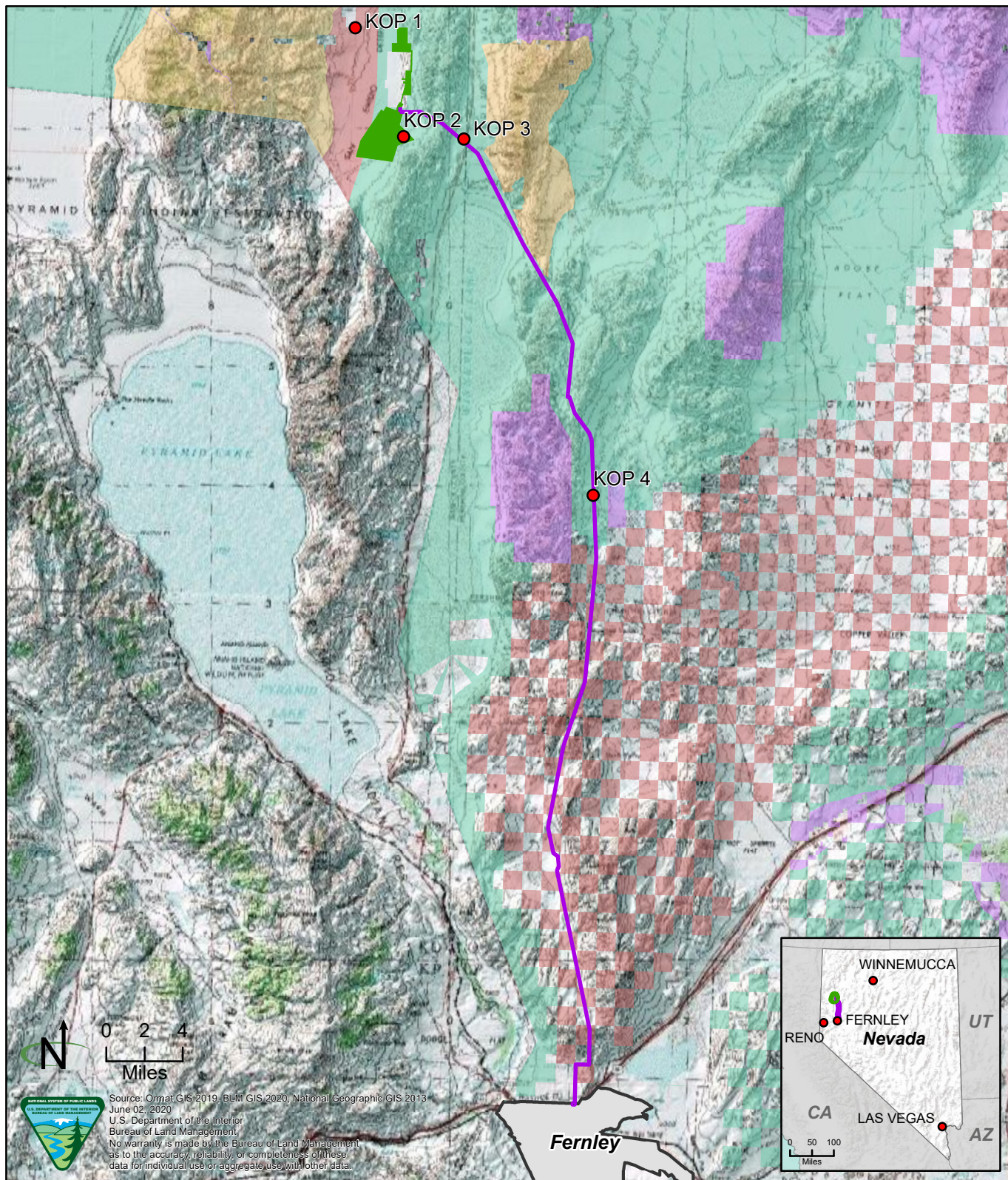
5.8 POST-CONSTRUCTION MONITORING

- Annual surveys will be conducted for the life of the project during breeding season to document nest use and success.
- Surveys will be conducted within 1-mile of the project footprint.
- Surveys will be coordinated with the USFWS.

Appendix E

Visual Resources Analysis Materials

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VRM Class and KOPs

- | | |
|------------------|---------------|
| Proposed gen-tie | VRM class I |
| Area of Interest | VRM class II |
| KOPs | VRM class III |
| | VRM class IV |

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

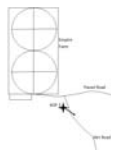
Date: 11/25/0219

District Office: Winnemucca District Office

Field Office: Black Rock Field Office

Land Use Planning Area: WDO RMP 2015

SECTION A. PROJECT INFORMATION

1. Project Name San Emidio II - North Valley Geothermal	4. KOP Location (T.R.S) T. 30N, R. 22E, Sec. 36	5. Location Sketch 
2. Key Observation Point (KOP) Name KOP 1	(Lat. Long) 40°25'52.92"N, 119°27'1.04"W	
3. VRM Class at Project Location Class IV		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat in foreground and middleground	Low to mid-rise shrubs, overall continuous simple form	None Evident
LINE	Regular horizontal in foreground and middleground, diagonal in background	Generally flat with weak undulation	None Evident
COLOR	Light and dark tans, moderate brown in background	Tan in foreground and middleground, brown in background	None Evident
TEXTURE	Smooth in foreground, moderate in background	Light to moderately coarse with some vegetation height variation	None Evident

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Horizontal and vertical	Linear forms from pipelines and access roads	Linear form from pipelines, slight verticality from power plant and transmission line poles
LINE	Horizontal and vertical	Lines created from power poles and access road	Vertical towers and horizontal access road
COLOR	Light browns	Tans and greens	Light brown access road, brown wood structures, tan pipelines and power plant
TEXTURE	Fine and smooth	Fine to moderate	Fine to moderate

SECTION D. CONTRAST RATING SHORT TERM ✓ LONG TERM

1. DEGREE OF CONTRAST		FEATURES												2. Does project design meet visual resource management objectives? <u>✓</u> Yes <u> </u> No (Explain on reverses side)	
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)					
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE		
ELEMENTS	FORM				✓				✓				✓		3. Additional mitigating measures recommended <u> </u> Yes <u>✓</u> No (Explain on reverses side) Evaluator's Names _____ Date _____ Photos and Contrast Evaluation by Peter Gower 11/25/2019
	LINE			✓				✓				✓			
	COLOR				✓				✓				✓		
	TEXTURE			✓					✓				✓		

SECTION D. (Continued)

Comments from item 2.

The buildings' exteriors and pipelines would be painted consistent with BLM visual color guidelines to blend with surrounding areas and minimize their visibility.

The proposed line would parallel the larger LADWP 500 kV distribution line for most of its length. The overhead conductors used on the gen-tie line power poles would have a matte surface to reduce sunlight reflection and glare.

The proposed facilities repeat basic element present in the landscape character, as there are already non-natural lines and forms, namely geothermal plant facilities, utility poles and transmission lines, roadways, fence lines, and other human-made structures. The horizon line would be discontinuous as power lines and facilities generally would not protrude above the skyline.

Reclaimed areas would be re-contoured to blend with surrounding topography to the extent possible. Suitable, BLM-approved re-vegetated methods would be used, and stockpiled topsoil used. Existing roads would be used whenever possible, and cross-country travel would be restricted to designated construction areas.

Nighttime lighting would be limited to those required to safely conduct the operations. The lights would be shielded or directed to focus direct light on the immediate work area to minimize impacts to night skies and dark spaces.

VRM Class IV Objective is to provide for activities that require major modifications of the existing character of the landscape. These activities may dominate the view and be the major focus of the viewer attention. Visual changes to the landscape would be weak to none as contrasts can be seen, but do not dominate the view.

Completed by Gabrielle Lukins 3/23/2020

Additional Mitigating Measures (See item 3)

No additional migration measures required outside of what is proposed within the Plan of Operations and applicant-committed environmental protection measures.

Completed by Gabrielle Lukins 3/23/2020

SECTION D. (Continued)

Comments from item 2.

The buildings' exteriors and pipelines would be painted consistent with BLM visual color guidelines to blend with surrounding areas and minimize their visibility.

The proposed line would parallel the larger LADWP 500 kV distribution line for most of its length. The overhead conductors used on the gen-tie line power poles would have a matte surface to reduce sunlight reflection and glare.

The proposed facilities repeat basic element present in the landscape character, as there are already non-natural lines and forms, namely geothermal plant facilities, utility poles and transmission lines, roadways, fence lines, and other human-made structures. The horizon line would be discontinuous as power lines and facilities generally would not protrude above the skyline.

Reclaimed areas would be re-contoured to blend with surrounding topography to the extent possible. Suitable, BLM-approved re-vegetated methods would be used, and stockpiled topsoil used. Existing roads would be used whenever possible, and cross-country travel would be restricted to designated construction areas.

Nighttime lighting would be limited to those required to safely conduct the operations. The lights would be shielded or directed to focus direct light on the immediate work area to minimize impacts to night skies and dark spaces.

VRM Class III Objective is to partially retain the existing character of the landscape, and activities may attract attention but should not dominate the view. Visual changes to the landscape would be weak as contrasts can be seen, but do not dominate the view.

Completed by Gabrielle Lukins 3/23/2020

Additional Mitigating Measures (See item 3)

No additional migration measures required outside of what is being proposed within the Plan of Operations and applicant-committed environmental protection measures.

Completed by Gabrielle Lukins 3/23/2020

SECTION D. (Continued)

Comments from item 2.

The buildings' exteriors and pipelines would be painted consistent with BLM visual color guidelines to blend with surrounding areas and minimize their visibility.

The proposed line would parallel the larger LADWP 500 kV distribution line for most of its length. The overhead conductors used on the gen-tie line power poles would have a matte surface to reduce sunlight reflection and glare.

The proposed facilities repeat basic element present in the landscape character, as there are already non-natural lines and forms, namely geothermal plant facilities, utility poles and transmission lines, roadways, fence lines, and other human-made structures. The horizon line would be discontinuous as power lines and facilities generally would not protrude above the skyline.

Reclaimed areas would be re-contoured to blend with surrounding topography to the extent possible. Suitable, BLM-approved re-vegetated methods would be used, and stockpiled topsoil used. Existing roads would be used whenever possible, and cross-country travel would be restricted to designated construction areas.

Nighttime lighting would be limited to those required to safely conduct the operations. The lights would be shielded or directed to focus direct light on the immediate work area to minimize impacts to night skies and dark spaces.

VRM Class III Objective is to partially retain the existing character of the landscape, and activities may attract attention but should not dominate the view. Visual changes to the landscape would be none as contrasts cannot be perceived, because activities repeat basic elements present in the existing landscape character.

Completed by Gabrielle Lukins 3/23/2020

Additional Mitigating Measures (See item 3)

No additional migration measures required outside of what is being proposed within the Plan of Operations and applicant-committed environmental protection measures.

Completed by Gabrielle Lukins 3/23/2020

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

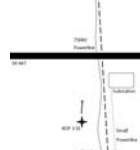
Date: 11/25/2019

District Office: Winnemucca District Office

Field Office: Black Rock Field Office

Land Use Planning Area: WDO RMP 2015

SECTION A. PROJECT INFORMATION

1. Project Name San Emidio II - North Valley	4. KOP Location (T.R.S) T. 29N, R. 23E, Sec. 25	5. Location Sketch 
2. Key Observation Point (KOP) Name KOP 3 (SE)	(Lat. Long) 40°20'58.99"N, 119°20'29.78"W	
3. VRM Class at Project Location Class III		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat in foreground, steeper diagonal terrain in middleground and background	Simple shrubs and grasses	Vertical transmission line poles
LINE	Horizontal to rolling	Regular and continuous	Vertical, SR 447 barely visible
COLOR	Tan and orange in foreground, browns in middleground	Tan to orange and brown	Metallic and brown
TEXTURE	Moderately coarse foreground, heavy in middleground	Even and moderately coarse	Crosshatch metal towers and vertical wood poles

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Vertical	Linear forms transmission line	Linear form from transmission line poles
LINE	Vertical	Lines created from power poles and access road	Vertical towers and horizontal access road
COLOR	Browns	Tans, browns, and greens (depending on season)	Light brown access road, brown wood pole structures
TEXTURE	Lightly coarse	Fine to moderately coarse	Fine to moderately coarse

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. DEGREE OF CONTRAST		FEATURES												2. Does project design meet visual resource management objectives? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Explain on reverses side)
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)				
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	
ELEMENTS	FORM				✓				✓				✓	3. Additional mitigating measures recommended <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Explain on reverses side) Evaluator's Names: Peter Gower Date: 11/25/2019
	LINE				✓				✓				✓	
	COLOR				✓				✓				✓	
	TEXTURE				✓				✓				✓	

SECTION D. (Continued)

Comments from item 2.

The buildings' exteriors and pipelines would be painted consistent with BLM visual color guidelines to blend with surrounding areas and minimize their visibility.

The proposed line would parallel the larger LADWP 500 kV distribution line for most of its length. The overhead conductors used on the gen-tie line power poles would have a matte surface to reduce sunlight reflection and glare.

The proposed facilities repeat basic elements present in the landscape character, as there are already non-natural lines and forms, namely geothermal plant facilities, utility poles and transmission lines, roadways, fence lines, and other human-made structures. The horizon line would be discontinuous as power lines and facilities generally would not protrude above the skyline.

Reclaimed areas would be re-contoured to blend with surrounding topography to the extent possible. Suitable, BLM-approved re-vegetated methods would be used, and stockpiled topsoil used. Existing roads would be used whenever possible, and cross-country travel would be restricted to designated construction areas.

Nighttime lighting would be limited to those required to safely conduct the operations. The lights would be shielded or directed to focus direct light on the immediate work area to minimize impacts to night skies and dark spaces.

VRM Class III Objective is to partially retain the existing character of the landscape, and activities may attract attention but should not dominate the view. Visual changes to the landscape would be none as contrasts cannot be perceived, because activities repeat basic elements present in the existing landscape character.

Completed by Gabrielle Lukins 3/23/2020

Additional Mitigating Measures (See item 3)

No additional migration measures required outside of what is being proposed within the Plan of Operations and applicant-committed environmental protection measures.

Completed by Gabrielle Lukins 3/23/2020

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

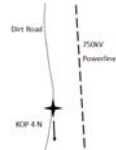
Date: 05/23/2019

District Office: Winnemucca District Office

Field Office: Black Rock Field Office

Land Use Planning Area: WDO RMP 2015

SECTION A. PROJECT INFORMATION

1. Project Name San Emidio II - North Valley	4. KOP Location (T.R.S) T. 26N, R. 25E, Sec. 32	5. Location Sketch 
2. Key Observation Point (KOP) Name KOP 4 N	(Lat. Long) 40° 4'53.48"N, 119°12'14.25"W	
3. VRM Class at Project Location Class III		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Sloping and undulating. Access road and transmission line	Continuous shrub cover except in access road corridor	Transmission line towers, otherwise no structures
LINE	Horizontal, banded, simple	Banded, horizontal	Vertical
COLOR	Tans and greens	Greens (will change to tans in summer and fall)	Metallic
TEX-TURE	Medium	Medium density, consistent cover	Sparse

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Horizontal and vertical	Linear form from access road	Vertical towers and horizontal access road
LINE	Horizontal and vertical	Lines created from power poles and access road	Vertical towers and horizontal access road
COLOR	Light brown	Tans and greens	Light brown access road, brown wood structures
TEX-TURE	Fine and smooth	Fine to moderate	Fine to moderate

SECTION D. CONTRAST RATING SHORT TERM ☒ LONG TERM

1. DEGREE OF CONTRAST		FEATURES												2. Does project design meet visual resource management objectives? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Explain on reverses side)
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)				
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	
ELEMENTS	FORM			✓					✓			✓		3. Additional mitigating measures recommended <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Explain on reverses side) Evaluator's Names: Peter Gower Date: 11/25/2019
	LINE			✓					✓			✓		
	COLOR				✓				✓			✓		
	TEXTURE			✓					✓			✓		

SECTION D. (Continued)

Comments from item 2.

The buildings' exteriors and pipelines would be painted consistent with BLM visual color guidelines to blend with surrounding areas and minimize their visibility.

The proposed line would parallel the larger LADWP 500 kV distribution line for most of its length. The overhead conductors used on the gen-tie line power poles would have a matte surface to reduce sunlight reflection and glare.

The proposed facilities repeat basic element present in the landscape character, as there are already non-natural lines and forms, namely geothermal plant facilities, utility poles and transmission lines, roadways, fence lines, and other human-made structures. The horizon line would be discontinuous as power lines and facilities generally would not protrude above the skyline.

Reclaimed areas would be re-contoured to blend with surrounding topography to the extent possible. Suitable, BLM-approved re-vegetated methods would be used, and stockpiled topsoil used. Existing roads would be used whenever possible, and cross-country travel would be restricted to designated construction areas.

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Completed by Gabrielle Lukins 3/23/2020

Additional Mitigating Measures (See item 3)

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Completed by Gabrielle Lukins 3/23/2020

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

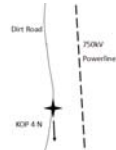
Date: 05/23/2019

District Office: Winnemucca District Office

Field Office: Black Rock Field Office

Land Use Planning Area: WDO RMP 2015

SECTION A. PROJECT INFORMATION

1. Project Name San Emidio II - North Valley	4. KOP Location (T.R.S) T. 26N, R. 25E, Sec. 32	5. Location Sketch 
2. Key Observation Point (KOP) Name KOP 4 S	(Lat. Long) 40° 4'53.48"N, 119°12'14.25"W	
3. VRM Class at Project Location Class III		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Sloping and undulating - access road and transmission line	Continuous shrub cover except in access road corridor	Transmission line towers, otherwise no structures
LINE	Horizontal, banded, simple	Banded, horizontal	Vertical
COLOR	Tans and greens	Greens (will change to tans in summer and fall), tan grasses	Metallic
TEXTURE	Medium	Medium density, consistent cover	Sparse

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Horizontal and vertical	Linear form from access road	Vertical towers and horizontal access road
LINE	Horizontal and vertical	Lines created from power poles and access road	Vertical towers and horizontal access road
COLOR	Light brown	Tans and greens	Light brown access road, brown wood structures
TEXTURE	Fine and smooth	Fine to moderate	Fine to moderate

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. DEGREE OF CONTRAST		FEATURES												2. Does project design meet visual resource management objectives? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Explain on reverses side)
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)				
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	
ELEMENTS	FORM			✓					✓			✓		3. Additional mitigating measures recommended <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Explain on reverses side) Evaluator's Names: Peter Gower Date: 11/25/2019
	LINE			✓					✓			✓		
	COLOR				✓				✓				✓	
	TEXTURE			✓					✓			✓		

SECTION D. (Continued)

Comments from item 2.

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Additional Mitigating Measures (See item 3)

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Completed by Gabrielle Lukins 3/23/2020

Visual Resource Photo Log

Date (MM/DD/YYYY)	Time (hh:mm)	Photo #	KOP # (4 digit sequential #, starting from 0001)	KOP Name	Elevation (feet)	Type of Feature Point Represents (stationary, along a route, boundary)	Observer Height	Comments and Methodology (description of the reasoning behind determining the KOP and description of the KOP)
11/25/19	12:24	KOP 1	0001	KOP 1	4,030	NW project boundary looking south to AOI	6 feet	Viewpoint is from Empire Farm looking southeast toward the project site/area of influence (AOI)
11/25/19	12:58	KOP 2	0002	KOP 2	4,218	SE project boundary looking west/northwest toward AOI	6 feet	Viewpoint toward the AOI from an elevated location directly adjacent to the project area
11/25/19	11:49	KOP 3	0003	KOP 3 (SE)	4,248	View southeast along existing transmission lines and proposed gen-tie line	6 feet	Point is along the proposed transmission line route; location is adjacent to a substation and State Route 447
11/25/19	11:49	KOP 3	0003	KOP 3 (NW)	4,248	View northwest along existing transmission lines and proposed gen-tie line	6 feet	Point is along the proposed transmission line route; location is adjacent to a substation and State Route 447
05/23/19	17:11	KOP 4	0004	KOP 4 (S)	5,399	View looking south along existing transmission line and proposed gen-tie line	6 feet	Point is along the proposed transmission line route near VRM Class II
05/23/19	17:11	KOP 4	0004	KOP 4 (N)	5,399	View looking north along existing transmission line and proposed gen-tie line	6 feet	Point is along the proposed transmission line route near VRM Class II



1. KOP 1. Viewpoint is from Empire Farms looking southeast toward the project site/area of influence. Photo taken November 25, 2019.



2. KOP 2. Viewpoint toward the area of influence from an elevated location directly adjacent to the project area. Photo taken November 25, 2019.



3. KOP 3 (SE). Point is along the proposed transmission line route; location is adjacent to a substation and State Route 447. Photo taken November 25, 2019.



4. KOP 3 (NW). Point is along the proposed transmission line route; location is adjacent to a substation and State Route 447. Photo taken November 25, 2019.



5. KOP 4 (S). Point is along the proposed transmission line route near VRM Class II. Photo taken May 23, 2019.



6. KOP 4 (N). Point is along the proposed transmission line route near VRM Class II. Photo taken May 23, 2019.

